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Mr. Andrews is Associate Curator of Mammalogy at the American Museum of Natural History, New York. In 1912 he conducted a zoölogical reconnaissance expedition, similar to that described in the present article, to the divide region between the Yalu and Tumen Rivers on the Korean-Manchurian border. Among his publications are two monographs on whales in the *Memoirs* of the Museum.

Mr. Woods is an English author and traveler who has an intimate acquaintance with the Balkan Peninsula and the Near East. For seven years he held a commission in the Grenadier Guards and later acted as military correspondent during the Balkan Wars. He is the author of the following works: "Washed by Four Seas: An English Officer's Travels in the Near East" (1908); "The Danger Zone of Europe: Changes and Problems in the Near East" (1911); "La Turquie et Ses Voisins" (1911); "War and Diplomacy in the Balkans" (1915). Mr. Woods contributed an article on "Albania and the Albanians" to the April *Review*.

Mr. De Booy has spent the last eight years conducting archeological investigations in the West Indies, and during this time explored many of the practically unknown islands off the tourist track. For a time he was associated with the Museum of the American Indian, to whose series of publications he contributed several papers on West Indian archeology. An article on "The Virgin Islands of the United States" by Mr. De Booy will be found in the November, 1917, *Review*.

Mr. Wallis is an authority on the teaching of geography, on which subject he published an important book in 1915. His attention was more especially directed to Austria-Hungary while assisting in the compilation of the Royal Geographical Society's emergency war map of Europe, on which occasion the sheets covering this country were allotted to him. In this connection he discussed a new method of mapping density of population and distribution of nationalities (*Geographical Journal*, March, 1916). A parallel article to the present, entitled "The Peoples of Hungary: Their Work on the Land," appeared in the December, 1917, *Review*. Others of his papers deal with the rainfall of the United States and (in the January, 1917, *Review*) the industrial geography of central England.

Mr. Cross is a Councilor of the American Geographical Society. Mr. Cross's extensive collection of old maps and atlases furnished the basis for the observations of the present article.

ARTICLES ON THE GEOGRAPHY OF THE WAR

published in the Geographical Review

The Great Russian Retreat. By D. W. JOHNSON. (25 pp.; with 6 maps and 6 photographs.) . . . . February, 1916.

The Balkan Campaign. By D. W. JOHNSON. (21 pp.; with 1 map and 4 photographs.) . . . . . July, 1916.

The Conquest of Rumania. By D. W. JOHNSON. (19 pp.; with 1 map and 3 photographs.) . . . . . June, 1917.

In these three articles Professor Johnson discusses the influence of geographical conditions on the military campaigns in the areas affected. The second deals with the campaign against Serbia at the end of 1915. Each article gives an outline of the physical features of the area discussed and is illustrated by maps showing the positions of the battle lines at various critical junctures.

The Military Campaigns Against Germany's African Colonies. By G. M. WRIGLEY. (22 pp.; with 5 maps.)

The more pronounced control of geographic conditions in the African as compared with the European campaigns, because of the larger areas affected and the greater dependency here of man on nature, is clearly brought out in this article. The campaign in each colony is illustrated by a map indicating the troop movements in relation to the topography. The article is accompanied by a full bibliography.

The Rôle of Political Boundaries. By D. W. JOHNSON. (5 pp.) . . . . . September, 1917.

A geographical discussion of the boundary problem, as set forth in several recent articles.

Europe at Turkey's Door. By LEON DOMINIAN. (9 pp.; with 2 maps.) . . . . . April, 1916.

Discusses the claims of the European powers to Turkish territory, based on political and economic grounds. Illustrated by a separate map showing the spheres of influence and territorial claims in Asiatic Turkey of Russia, England, France, Greece, and Italy.

The Geographical Distribution of the Balkan Peoples. By JOVAN CVIJIĆ. (17 pp.; with 1 insert map in color.) . . . . . May, 1918.

An article by the foremost geographer of Serbia. The accompanying colored map shows the distribution of nationalities and creeds in great detail.

The Zones of Civilization of the Balkan Peninsula. By JOVAN CVIJIĆ. (13 pp.; with 1 insert map in color.) . . June, 1918.

Discusses the growth and present distribution (shown on colored map) of the two main forces, Old Balkan (modified Byzantine) civilization and the patriarchal régime, and the subsidiary influences, Turco-Oriental, Italo-Mediterranean, Mediterranean, Central European, Western European.

Albania and the Albanians. By H. CHARLES WOODS. (17 pp.; with 1 map and 8 photographs.) . . . . April, 1918.

A discussion of the political geography of this newest Balkan state by a first-hand observer of the country and its people.

Russia's War-Time Outlets to the Sea. (5 pp.; with 1 map.) . . . . . February, 1916.

Deals with the closing of the Baltic and Black Sea outlets to Russia by the war and her circumvention of this obstacle, especially by the construction of a railroad to Kola, an ice-free port on the Arctic Ocean. With map.

The Economic Resources of the Russian Empire. By E. K. REYNOLDS. (17 pp.; with 1 map and 10 photographs.) . . . . . April, 1916.

Accompanied by a map showing the distribution of the main economic resources of both European and Asiatic Russia.

(Continued on next page)

Flanders. By RAOUL BLANCHARD. (17 pp.; with 2 maps and 9 photographs.) . . . . . December, 1917.

A summary of the geography, physical and human, of one of the most important battle areas of the present war.

The Peoples of Hungary: Their Work on the Land. By B. C. WALLIS. (17 pp.; with 8 maps.) . . . . December, 1917.

A discussion of the human geography of Hungary, with special attention to the problem of nationalities. Two of the accompanying maps, representing by a new method the population density and distribution of nationalities, are especially valuable.

The Carpathians: Physiographic Features Controlling Human Geography. By EMMANUEL DE MARTONNE. (21 pp.; with 2 text-maps, 1 insert map in color, 3 diagrams, and 10 photographs.) . . . . . June, 1917.

A general account, illustrated by a colored physiographic map, of the interrelations of the physical features and human life, many of which have a bearing on the military operations of the present war in this area.

Poland: The Land and the State. By EUGENIUSZ ROMER. (20 pp.; with 12 maps.) . . . . . July, 1917.

A geographical interpretation of Poland's history and development and an exposition of her essential geographical unity. The article is accompanied by ten black-and-white maps illustrating the racial and territorial development of Poland from 800 to 1795.

The Racial History of the British People. By H. J. FLEURE. (16 pp.; with 2 maps.) . . . . . March, 1918.

A geographical exposition of the early racial movements which led to the settlement of Britain and their reflection in the composition of the present-day population.

Trade Movements and the War. (2 pp.) . . . March, 1916.

Our Trade in the Great War. By MARK JEFFERSON. (7 pp.; with 3 diagrams.) . . . . . June, 1917.

The first article points out various fundamental effects of the war on world trade. The second deals with the trade of the United States before our entry into the war. By grouping the statistics concerning the chief countries with which we have trade dealings into four groups, viz. the Allies, the Central Powers, the Near Neutrals, and the Far Neutrals (with respect to Germany), the various factors affecting the war trade are more clearly discerned.

Aëronautical Charts. By OMAR B. WHITAKER. (5 pp.; with 2 maps.) . . . . . July, 1917.

Aëronautical Maps and Aërial Transportation, By HENRY WOODHOUSE. (22 pp.; with 4 maps, 3 drawings, and 5 photographs.) . . . . . November, 1917.

European War Maps. By W. L. G. JOERG. (4 pp.) . . July, 1917.

The first two articles discuss a phase of mapping of high importance in the development of the aëroplane. They are illustrated by reproductions of aëronautical maps used in this country and in Europe. The second article also deals with the commercial possibilities of aëronautics in the immediate future. The third article gives a selected list of maps, detailed topographic sheets as well as general maps, of use in following the military operations in Europe.

THE
GEOGRAPHICAL REVIEW

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ZOÖLOGICAL EXPLORATIONS IN YÜNNAN PROVINCE, CHINA

By ROY CHAPMAN ANDREWS
American Museum of Natural History

THE PLATEAU OF CENTRAL ASIA

The earliest remains of primitive man probably will be found somewhere in the vast plateau of Central Asia, north of the Himalaya Mountains. From this region came, it is believed, the successive invasions that poured into Europe from the east, into India from the north, and into China from the west; the migration route to North America led over Bering Strait and spread fan-wise south and southeast to the farthest extremity of South America. The Central Asian plateau at the beginning of the Pleistocene was probably less arid than it is today, and there is reason to believe that this general region was the distributing center not only of man but also of many of the forms of mammalian life now found in other parts of the world. For instance, our American moose, the wapiti or elk, the Rocky Mountain sheep, the so-called mountain goat, and other animals are probably of Central Asian origin.

Doubtless there were many causes that contributed to the extensive wanderings of primitive tribes; but, as these tribes were primarily hunters, one of the most important must have been the movements of the game upon which they lived. Therefore the study of the early human races is necessarily closely connected with, and dependent upon, a knowledge of the Central Asian mammalian life and its distribution. No systematic paleontological, archeological, or zoölogical study of this region on a large scale has ever been attempted, and it is safe to say that there is no similar area of the inhabited surface of the earth about which so little is known.

ITS EXPLORATION

The American Museum of Natural History hopes in the near future to conduct extensive explorations in this part of the world along general

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scientific lines. The country itself and its inhabitants, however, present unusual obstacles to scientific research. Not only is the region one of vast intersecting mountain ranges, the greatest of the earth, but the climate is too cold in winter to permit of continuous work. The people have a natural dislike for foreigners, and political events in the last half century have not tended to decrease their suspicions.

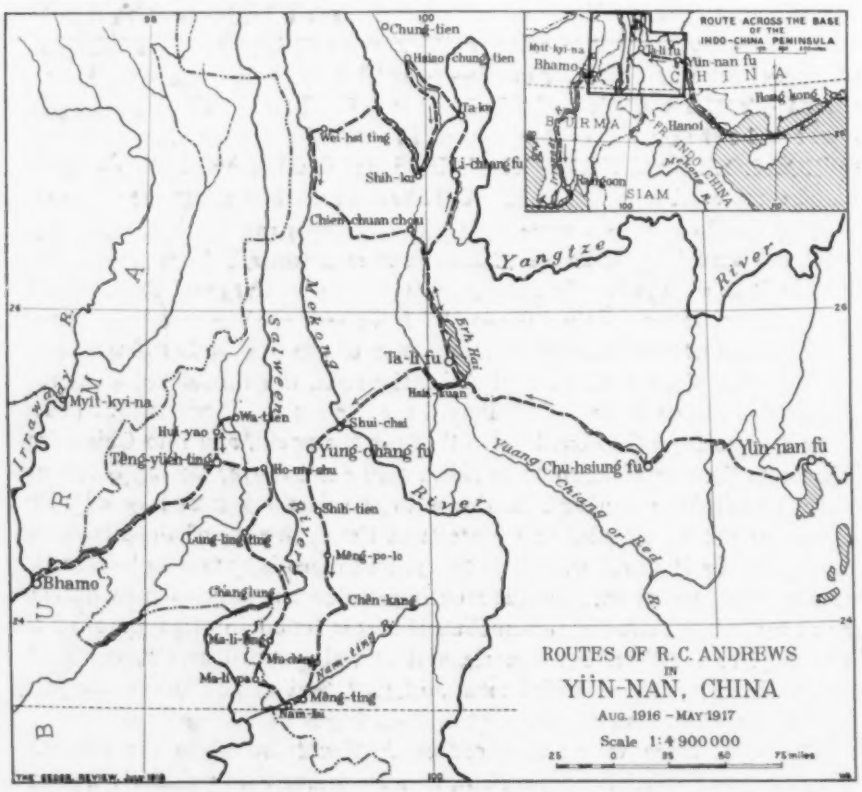

FIG. 1—Sketch map showing the routes of R. C. Andrews in Yün-nan, China, August, 1916-May, 1917. Scale 1:4,900,000. The inset shows the location of the main map and the author's route from Hongkong to Rangoon.

It is possible, indeed, to overcome such difficulties, but the plans for extensive research must be carefully prepared. One of the most important steps is the sending out of preliminary expeditions to gain a general knowledge of the natives and the fauna and of the conditions to be encountered. For the first reconnaissance, which was intended to be largely a mammalian survey, the Asiatic Zoölogical Expedition left New York in March, 1916.

A Little-Known Province of China

Its destination was Yün-nan, the southwesternmost province of China. This is one of the least-known parts of the Chinese Republic, and, because

FIG. 2—Gorge of the Yangtze River near Ta-ku ferry, Yün-nan.

This is in the region where the upper Salween, Mekong, and Yangtze Rivers, flowing in deep longitudinal valleys between the lofty ranges of the mountains that sweep southward from the Tibetan plateau to the tip of the Malay Peninsula, approach each other to within 20 or 25 miles. While the other two continue southward to the sea the Yangtze turns to the east and breaks through the mountains. In so doing it here doubles back upon itself, making a loop some 60 miles long and only 15 miles wide.

(Figs. 2-12 from photographs by Yvette Borup Andrews.)

of its southern latitude and high mountain systems, the climatic and faunal range is very great. It is about equal in size to the state of California and topographically might be likened to the ocean in a furious gale, for the greater part of its surface has been thrown into vast mountain waves which divide and cross one another in hopeless confusion.

Yün-nan is bordered on the north by Szechuan and a small portion of Tibet, on the west by Burma, on the south by Tonking, and on the east by Kweichau and Kuangsi Provinces. Faunistically the entire northwestern part of Yün-nan is essentially Tibetan, and the plateaus and mountain peaks range from altitudes of 8,000 feet to 20,000 feet above sea level. In the south and west along the borders of Burma and Tonking, in the low fever-stricken valleys, the climate is that of the mid-tropics, and the native life as well as the fauna and flora are of totally different types from those found in the north.

The natives of Yün-nan are exceptionally interesting. There are about thirty non-Chinese tribes in the province, some of which, such as the Shans and Lolos, represent the aboriginal inhabitants of China. It is safe to say that in no similar area of the world is there such a variety of languages and dialects spoken as in this region.

Personnel of the Expedition

The white members of the first Asiatic Zoölogical Expedition included Mr. Edmund Heller, whose attention was chiefly devoted to the collection of small mammals, my wife, Yvette Borup Andrews, who acted as photographer, and myself, in general charge of the party. A Chinese interpreter, Wu Hung-tao, with five native assistants and ten muleteers completed the personnel. After a short side trip in the Province of Fukien, to hunt tigers, we outfitted in Hongkong and in late August left for Yün-nan by way of the French railroad through Tonking.

By Rail to Yün-nan fu

The railroad is a remarkable engineering achievement, for it was constructed in great haste through a difficult mountainous range. Yün-nan is an exceedingly rich province, and the French were quick to see the advantages of drawing its vast trade to their own seaports. The British were already making surveys to construct a railroad from Bhamo on the headwaters of the Irrawady River across Yün-nan to connect with the Yangtze, and the French were anxious to have their road to Yün-nan fu in operation some time before the rival line could be completed.

Owing to its hasty construction and the heavy rainfall, or perhaps to both, the tunnels frequently cave in and bridges are washed away (over the mountains there is a tunnel or bridge almost every mile) so that the railroad is chiefly remarkable for the number of days in the year in which it does not operate; nevertheless the French deserve great credit for their

enterprise. While the railroad was being built through the fever-stricken jungles of Tonking the coolies began to die like flies, and it was necessary to suspend all work during the summer months.

When we arrived in Yün-nan fu we found a surprisingly cosmopolitan community housed within its grim old walls. There were consuls, missionaries, Chinese officials, and representatives of business firms in Hongkong; all received us with the open-handed hospitality characteristic of the East.

By Caravan to Ta-li fu

On September 9 we left Yün-nan fu with a caravan of thirty-three mules and horses. Our destination was Ta-li fu, the largest city in central Yün-nan, fourteen days' travel directly west. When we were fairly launched upon our long ride the time slipped by in a succession of delightful days. Since this was the main caravan route, the *mafus* (muleteers) had regular stages beyond which they would not go. If we did not stop for luncheon the march could be ended early in the afternoon and we could settle ourselves for the night in a temple, which always proved a veritable "haven of rest" after a long day in the saddle.

For centuries this road has been one of the main trade arteries through the province, and, with that total lack of any idea of conservation so characteristic of the Chinese, every available bit of natural forest has been cut away. As a result the mountains are desert wastes of sandstone alternating with grass-covered hills sometimes clothed with groves of pines or spruces. These trees have all been planted and, before they have reached a height of fifteen or twenty feet, will yield to the insistent Chinese demand for wood.

The ignorance of the need of forest conservation is an illuminating commentary on Chinese education. Mr. William Hanna, a missionary of Ta-li fu, told us that one day he was riding over this same road with a Chinese gentleman who was considered to be one of the best educated and most learned men of the province. Pointing to the barren hills washed clean of soil and deeply worn by countless floods, Mr. Hanna remarked that all this could have been prevented and that instead of a rocky waste there might have been a fertile hillside had the trees been left to grow. The Chinese scholar listened in amazement to facts which every western schoolboy has learned before he is twelve years old, but of which he was ignorant because they are not a part of Confucius' teachings. To study modern science is considered a waste of time by the orthodox Chinese, for "everything good must be old," and all his life he delves into the past, utterly neglectful of the present.

Every valley along the road was green with rice fields, and this together with the deforestation of the mountains is responsible for the almost total lack of animal life. Night after night we set traps about our temple camps only to find them untouched in the morning. There were no mammals with

FIG. 3—Ta-li fu, seen from the walls surrounding the town.

the exception of a few red-bellied squirrels (*Callosciurus erythraeus*) and now and then a tree shrew (*Tupaia chinensis*).

As we neared Ta-li fu and indeed along the entire road we were amazed at the prevalence of goiter. At a conservative estimate two out of every five persons were suffering from the disease, some having two, or even three, globules of uneven size hanging from their throats. In one village six out of seven adults were affected; apparently children under twelve or fourteen years are free from it, as we saw no evidences in either sex. Probably the disease is in a large measure due to the drinking water, for it is most prevalent in the limestone regions and seems to be somewhat localized.

On Friday, September 24, we reached Hsia-kuan, a large commercial town at the lower end of Erh Hai, the lake near which Ta-li fu lies. Many merchants live there, and it is by all means the most important business place of interior Yün-nan; Ta-li, eight miles away, is the residence and official city.

This was the hottest day of our experience in the northern part of the province, the thermometer registering 85° in the shade. This is the usual mid-summer temperature, but the moment the sun dropped behind the mountains it was cool enough for one to enjoy a fire. Even in winter it is never very cold, and the delightful summer should make northern Yün-nan a wonderful health resort for residents of fever-stricken Burma and Tonking.

Ta-li fu

We rode toward Ta-li with the beautiful lake on our right hand and on the other the Tsang Shan, mountains which rise to a height of 14,000 feet. As we approached the city we could see dimly outlined against the mountains the slender shafts of three ancient pagodas. They were erected to the spirits of the "earth, wind, and water" and for over fifteen hundred years have stood guard over the stone graves which, in countless thousands, are spread along the foot of the mountains like a vast gray blanket. In the late afternoon sunlight the walls of the city seemed to recede before us, and the picturesque gate loomed shadowy and unreal even when we passed through its gloomy arch and clattered up the stone-paved street.

Besides Mr. Evans, the representative of the British-American Tobacco Company, the foreign residents of Ta-li fu include the Rev. William J. Hanna, his wife, and two other women, all of the China Inland Mission. Mr. Hanna is doing a really splendid work, especially along educational and medical lines. He has built a beautiful little chapel and a large school and dispensary in connection with his house, where he and his wife are occupied every morning treating the minor ills of the natives, Christian and heathen alike.

Ta-li fu was the scene of tremendous slaughter at the time of the Mohammedan war, when the Chinese captured the city through the

treachery of its commander and turned its streets into rivers of blood. The Mohammedans were almost exterminated, and the ruined stone walls testify to the completeness of the Chinese devastation.

Ta-li fu and Hsia-kuan are large fur markets, and we spent some time investigating the shops. One important find was the panda (*Aelurus fulgens*). The panda is an aberrant member of the raccoon family but looks more like a fox; in fact the Chinese call it the "fire fox" because of its beautiful red fur. Pandas were supposed to be exceedingly rare, and we could hardly believe our eyes when we saw dozens of coats made from their skins hanging in the fur shops.

Skins of the huge red-brown flying squirrels, *Petaurista yunnanensis*, were also used for clothing, and the abundance of this animal was almost as great a surprise as were the pandas. This is often the case with supposedly rare species. A few specimens are first secured, perhaps from the extreme limits of its range or from a locality where it really is rare, and for years such specimens may be unique in museum collections; but eventually the proper locality may be visited and the animals found to be abundant.

We saw several skins of the beautiful cat *Felis temmicki*, which, with skins of the snow leopard (*Felis uncia*), were said to have come from Tibet. Civets, bears, foxes, and small cats were being used extensively for furs, and pangolins could be purchased in the medicine shops. The scales of the pangolin are considered of great value in the treatment of certain diseases, and the skins are usually sold by the pound, as are the horns of deer, wapiti, gorals, and serows.

Almost all of the fossil animals which have been obtained in China by foreigners have been purchased in apothecary shops. If a Chinaman discovers a fossil bed he guards it zealously for it is as good as a gold mine to him. The bones are ground into a fine powder and when mixed with an acid produce a phosphate which has in reality a certain value as a tonic. When a considerable amount of faith and Chinese superstition is added, its efficacy is doubled.

Li-chiang fu and the Mosos

We left a portion of our outfit at Ta-li fu and with a new caravan of twenty-five animals traveled northward for six days to Li-chiang fu. We took a byroad in the hope of finding good collecting in the pine forests three days from Ta-li but instead found a total absence of animal life. The woods were beautiful parklike stretches which in a country like California would be full of game but here were silent and deserted. During the fourth and fifth days we were still in the forests but on the sixth crossed a pass 10,000 feet high and descended abruptly into a long marshy plain where the gray outlines of Li-chiang were dimly visible against the mountains at the far end.

The city is a most interesting place, especially on market day, for its inhabitants represent many different tribes, with comparatively few Chinese. By far the greatest percentage of natives are the Mosos,[1] who are semi-Tibetan in their life and customs. They were originally an independent race ruling a considerable portion of northern Yün-nan and having Li-chiang as their capital. To the effeminate, insincere, and "highly civilized" Chinese they are "barbarians," but we found them to be simple, honest, and wholly delightful people. Many of those whom we met later

FIG. 4—A Moso house near Li-chiang.

had never seen a white woman, and yet their inherent decency was in the greatest contrast to the Chinese, who consider themselves immeasurably their superior.

The Mosos have large herds of sheep and cattle, and this is the one place in the Orient, except in large cities along the coast, where we could obtain fresh milk and butter. With them as with the Tibetans buttered tea and *tsamba* (parched oatmeal) are the great essentials. Buttered tea is prepared by churning fresh butter into hot tea until the two have become well mixed. It is then thickened with finely ground *tsamba* until a ball is formed which is eaten with the fingers. The combination is decidedly good when the ingredients are fresh, but if the butter happens to be rancid the less said of it the better. The Mosos also raise great quantities of excellent squash, turnips, carrots, cabbage, potatoes, onions, corn, peas, beans,

[1] For a brief account of the Mosos see the article by Dr. Laufer commenting on the American Geographical Society's Moso manuscript, *Geogr. Rev.*, Vol. 1, 1916, pp. 274-285; cf. also the account of lamasery life at Wei-hsi by the late Francis H. Nichols, who procured the manuscript, *Bull. Amer. Geogr. Soc.*, Vol. 47, 1915, pp. 100-114.—EDIT. NOTE.

oranges, pears, persimmons, and nuts. While traveling we had our saddle pockets filled with pears and English walnuts or chestnuts and could replenish our stock from almost any village along the road. Everything was absurdly cheap. Eggs were usually about eight cents (Mexican) a dozen, and we could always purchase a chicken for an empty tin can, or two for a bottle. In fact bottles were in great demand, and when offers of money failed to induce a native to pose for the camera a bottle would nearly always decide him.

FIG. 5—A Moso with a porcupine. The natives of northern Yün-nan use crossbows with poisoned arrows.

GORALS AND SEROWS

At Li-chiang we learned that there was good shooting only twelve miles north of the city on the Snow Mountain range, the highest peak of which rises 18,000 feet above the sea. Proceeding thither we camped in a beautiful little meadow at an altitude of 12,000 feet, and for a month had some remarkably successful hunting on the slopes of the Snow Mountain. Our attention was chiefly centered upon gorals and serows, of which we obtained a splendid series.

These animals belong to the subfamily *Rupicaprinae*, which is an early mountain-dwelling offshoot of the Bovidae; this subfamily also includes the chamois, takin, and the so-called Rocky Mountain goat of America. The group is commonly referred to as "goat-antelopes" in order to express the intermediate position which they are supposed to hold between the true goats and antelopes. They are also sometimes called the Rupicaprine antelopes from the scientific name of the chamois (*Rupicapra*).

The horns of all members of the group are finely ridged and subcylindrical. They are present in both sexes, being almost as long in the female as in the male. Although no one would suspect that the gorals are more closely related to the takins than to the serows, which they resemble superficially, such seems to be the case, but the cranial differences between the two genera are to a certain extent bridged over by the skull of the small Japanese serow (*Capricornulus crispus*). One of the principal differences, besides that of size, is in the fact that the serows have a short tail and a

well-developed face gland, which opens in front of the eyes by a small orifice, while the gorals have a long tail and no such gland.

From Snow Mountain to Ta-ku Ferry

In mid-November we left the Snow Mountain with a caravan of twenty-six mules and horses. Following the road from Li-chiang to the Yangtze we crossed the "Black Water" and climbed steadily upward over several tremendous wooded ridges each higher than the last to the summit of the divide.

The descent was gradual through a magnificent pine and spruce forest. Some of the trees were at least 150 feet high and were draped with beautiful gray moss which had looped itself from branch to branch and hung suspended in delicate streamers yards in length. The forest was choked with underbrush and a dense growth of dwarf bamboo, and the hundreds of fallen logs carpeted with bronze moss made ideal conditions for small mammal collecting. However, as the species would probably all be similar to those we had secured on the Snow Mountain we did not feel that it was worth while stopping to trap.

Two days later we rode along a broad trail through a beautiful pine forest and stood on an open summit gazing on one of the most impressive sights which China has to offer. At the left, and a thousand feet below, the mighty Yangtze has broken through the mountains and made a gorge a mile deep, a gorge which seems to have been carved out of the solid rock sharp and clean as by a giant's knife. A few miles to the right the mountains widen, leaving a flat plain two hundred feet above the river. Every inch of this plain, as well as the finger-like valleys which stretch upward between the hills, is under cultivation, giving support to three villages, the largest of which is Ta-ku.

The ferry is in a bad place, but it is the only spot for miles where the river can be crossed. The right (east) bank is so precipitous that the narrow trail from the plain twists and turns like a snake before it emerges upon a narrow sand and gravel beach. The opposite side of the river is a vertical wall of rock which slopes back a little at the lower end to form a steep hillside covered with short grass. The landing place is a mass of jagged rocks fronting a small patch of still water, and the trail up the face of the cliff is so steep that it can not be climbed by any loaded animal, so that all the packs had to be unstrapped and laboriously carted up the slope on the backs of the *mafus*.

The cliffs above the river are honeycombed with caverns. They are of two kinds, gold quarries and dwelling caves. The latter consist of a long central shaft, which widens into a circular room, and is just high enough to allow a man to stand erect. Along the sides of the corridor shallow nests have been scooped out to serve as beds, and all the cooking is done not far from the door. The caves, although almost dark, make fairly comfortable

FIG. 6.

FIG. 7.

FIG. 6—The Mekong River southwest of Wei-hsi.

FIG. 7—The Mekong valley southwest of Wei-hsi. The sides of the mountains are here cultivated; the patches of white are corn.

FIG. 8.

FIG. 9.

FIG. 8—The Mekong-Salween divide from the summit of a 12,000-foot pass east of Wei-hsi.
FIG. 9—In the unmapped country between the Yangtze River and the Chung-tien road.

living quarters and are by no means as dirty or as ill-smelling as the ordinary native house. The mines are straight shafts dug into the cliffs; in them rock is quarried and crushed by hand.

Chung-tien and the Tibetans

From the Yangtze River we traveled northwestward across an unmapped area toward Chung-tien, a village well within the Tibetan sphere of influence, where Chinese authority is merely nominal. The region was one of vast mountain ridges, from 10,000 to 15,000 feet in height, heavily forested with pine and spruce. There are but few inhabitants, for the precipitous mountain sides offer little opportunity for agriculture and game is not abundant.

Fig. 10—Two Tibetans with their leading caravan mule.

When we reached the Chung-tien road we were on one of the great trade routes into Tibet, and over it caravans were continually passing laden with tea or pork. Many of them had traveled the entire length of Yün-nan to Sze-mao on the Tonking frontier, where a special kind of tea is grown, and were hurrying northward to cross the snow-covered passes which form the gateways to the "Forbidden Land."

Every Tibetan is a study for an artist. He wears a fur cap, a long loose coat like a Russian blouse thrown carelessly off one shoulder and tied in about the waist, blue or red trousers, and high boots of felt or skin reaching almost to the knees. A long sword, its hilt inlaid with bright-colored bits of glass or stones, is half concealed beneath his coat, and he is seldom without a gun or a murderous-looking spear. In the breast of his loose coat, which serves for a pocket, he carries a remarkable assortment of articles: a pipe and tobacco, tea, *tsamba*, cooking pots, a snuffbox, and hanging down in front a metal charm to protect him from bullets and sickness.

The eastern Tibetans are men of splendid physique and great strength and are frequently more than six feet in height. They have brick red

complexions, and many are really handsome in a full-blooded, masculine way. Their straight features suggest a strong mixture of other than Mongolian stock. They are the direct antithesis of the Chinese in every particular; their strength and virility and the dashing swing of their walk are refreshing to look upon after contact with the ease-loving, effeminate Chinamen whom we generally saw carried along the road sprawling in mountain chairs.

To Wei-hsi by way of Shih-ku

On September 5, after a heavy fall of snow, we left the Chung-tien region for an eight-day trip to Wei-hsi, not far from the Mekong River. Although we looked forward with no pleasure to the long ride over the mountain passes which separated us from Wei-hsi, we expected to find new mammals in the Mekong valley. We followed down the river gorge at the upper end of which Chung-tien is located and left the forests when we emerged on the main road. From the top of a 10,000-foot pass there was a magnificent view down the canyon to the snow-capped mountains, which were beautiful beyond description in their changing colors of purple and gold.

On the second day we saw before us seven snow-crowned peaks as sharp and regular as the teeth of a saw and reached the mouth of the stream where it spreads like a fan over a sandy delta and empties into the Yangtze. Here the mighty river, flowing proudly southward from its home on the wind-blown steppes of the "Forbidden Land," countless ages ago found the great Snow Mountain range barring its path. Thrust aside, it doubled back upon itself along the barrier's base, restlessly seeking a passage through the wall of rock. Far to the north it bit hungrily into the mountain's side again, broke through, and swung south, gathering strength and volume from hundreds of tributaries as it rushed onward to the sea.

For two days we rode along the river bank and crossed at the Shih-ku ferry. There was none of the difficulty here which we had experienced at Ta-ku, for the river is wide and the current slow. It required only two hours to transport our entire caravan, while at the other ferry we had waited a day and a half. Strangely enough, while there are dozens of villages along the Yangtze and the valley is highly cultivated, we saw no sign of fishing. Moreover, we passed but three boats and five or six rafts, and it was evident that this great waterway, which for fifteen hundred miles from its mouth influences the trade of China profoundly, is here used but little by the natives.

After two and a half days' travel up the Yangtze we turned westward toward Wei-hsi and on December 11 had tiffin on the summit of a 12,000-foot pass in a beautiful snow-covered meadow, from which we could see the glistening peaks of the vast mountain range which forms the Mekong-Salween divide. In the afternoon we reached Wei-hsi and camped in a

grove of splendid pine trees on a hill overlooking the city. The place was rather disappointing after Li-chiang. The shops were poor, and it was difficult to buy rice even though the entire valley was devoted to paddy fields, but we did get quantities of delicious persimmons.

Wu told us that seven different languages were spoken in the city, and we could well believe it, for we recognized Mosos, Lolos, Chinese, and Tibetans. This region is nearly the extreme western limit of the Moso tribe, which appears not to extend across the Mekong River.

On the Mekong

From Wei-hsi a stiff climb of a day and a half over a thickly forested mountain ridge, frozen and snow-covered, brought us in sight of the green waters of the Mekong, which has carved a gorge for itself in an almost straight line from the bleak Tibetan plateaus to this part of Yün-nan on its way southward through Indo-China to the sea.

Our second camp was on the river at the mouth of a deep valley, near a small village. Wu said that the natives were Lutzus, and I am inclined to believe that he was right, although Major Davies on his map[2] indicates this region to be inhabited by Lisos. At any rate these people both in physical appearance and dress were quite distinct from the Lisos whom we met later. They were exceedingly pleasant and friendly, and the chief, accompanied by four venerable men, brought a present of rice. I gave him two tins of cigarettes, and the natives returned to the village wreathed in smiles. The garments of the Lutzus were characteristic and quite unlike those of the Mosos, Lisos, or Tibetans. The women wore a long coat or jacket of blue cloth, trousers, and a very full pleated skirt. The men were dressed in plum-colored coats and trousers.

The Mekong on an average is not more than a hundred yards wide in this region, and, like the Yangtze, its water is very green from the Tibetan snows. The prevailing rock is red slate and sandstone, instead of limestone, as in the country to the eastward. The sides of the valley are so precipitous that it would seem impossible for a human being to walk over them, and yet they are patched with brown cornfields from the summit to the water. Considering the small area available for cultivation there are a considerable number of inhabitants; they have gathered into the villages and seldom live in isolated houses, as in the Yangtze valley.

Wherever a stream comes down from the mountain's side or can be diverted by irrigating ditches, the ground is beautifully terraced for rice paddys; but in other places, corn and peas appear to be the principal crops. Very few vegetables, such as turnips, squash, carrots, and potatoes, are raised; this is rather remarkable since they are so abundant in all the country between the Mekong and the Yangtze Rivers. In several places the water was spanned by rope bridges. The cables are made of twisted

[2] Map of Yün-nan. 1:1,267,200. Geogr. Section, General Staff No. 2112, War Office, London, April, 1906, corrected to Dec., 1908.

FIG. 11.

FIG. 12.

FIG. 11—In the unmapped country between the Mekong and Ta-li fu.
FIG. 12—The Yangtze gorge near Ta-ku ferry (see Fig. 2).

bamboo; and, since one end is necessarily higher than the other, there are always two ropes—one to cross each way. The traveler is tied by leather thongs in a sitting position to a wooden "runner" which slides along the bamboo cable and shoots him across the river at tremendous speed.

The valley is hopeless from a zoölogical standpoint. It is too dry for small mammals, and the mountain slopes are so precipitous, so thinly forested, and so generally undesirable that, except for gorals, no other large game would live there. The bird life is decidedly uninteresting. There are no cranes or shelldrakes, and except for a few flocks of mallards which feed on the rice fields we saw no other ducks or geese.

Salt Wells

On December 20 we turned away from the Mekong valley and began to march southeast by east across an unmapped region in the direction of Ta-li fu. Five days later we reached a very dirty Chinese town in a deep valley near some extensive salt wells. Red clay dust lay thickly over everything, and the filth of the streets and houses was indescribable. When we left on the following day we passed dozens of caravans and groups of men and women carrying great disks of salt. Each piece was stamped in red with the official mark, for salt is a government monopoly and only licensed merchants are allowed to deal in it; moreover, the importation of salt from foreign countries is forbidden. For purposes of administration China is divided into seven or eight main circuits, each of which has its own sources of production, and the salt obtained in one district is not to be sold in another. In Yün-nan salt is supplied from three regions. The water from the wells is boiled in great caldrons for several days, and the resulting deposit is earth, impregnated with salt. This is crushed, mixed with water, and boiled again until only pure salt remains.

Results

On January 5 we again reached Ta-li fu. Our work in the north had brought us a collection of 1,300 mammals as well as several hundred birds, much material for habitat groups, and a splendid series of photographic records in Paget color plates, black and white negatives, and motion-picture film; but what was of first importance, we had covered an enormous extent of diverse country and learned much about the distribution of the fauna of northern Yün-nan. The 1,300 mammals of our collection were taken in a more or less continuous line across six tremendous mountain ranges and furnish an illuminating cross-section of the entire region from Ta-li fu north to Chung-tien and west to the Mekong River. It is apparent that in this portion of the province even the smallest mammals are widely spread and that the principal factor in determining distribution is the flora. Neither the highest mountain ridges nor such deep, swift rivers as the Yangtze and the Mekong appear to act as effective barriers to migration, and as long as the vegetation remains constant the fauna changes but little.

THE BALKANS, MACEDONIA, AND THE WAR*

By H. CHARLES WOODS

Throughout the last few decades and more especially since the re-establishment of the Ottoman constitution in the year 1908, the political and military situations in the Near East have been of worldwide importance. On the one hand the Balkan Peninsula and Asia Minor, inhabited as they are by many diverse peoples, have been the scene of many an insurrection and massacre. On the other hand the rivalry which has existed for years between the Powers of the former Triple Entente and the Triple Alliance, or more correctly the long-planned schemes for Germanic domination in the East, have made this area an ever-present "danger zone of Europe."

International Relations

The fundamental reasons which have forced the Near East into prominence before and since the outbreak of the war are in many ways identical. The real point is that the Balkan Peninsula and the waterways which it controls constitute the natural highway, the natural means of communication between the West and East on the one hand and the North and South on the other. While it is the former condition which makes the domination of this area one of Germany's primary objects it is the latter which constitutes its real importance for Russia. Consequently, whereas by military penetration across the Balkans into southern Russia and Asiatic Turkey the Central Powers have temporarily greatly increased the strength of their military position, still more by the driving of a permanent wedge through the same areas would they have triumphed by endangering the safety of the Allies throughout the world. On the other hand, were good relations to be established between the Balkan states and were an anti-German barrier therefore to be established, what would amount to an Allied wedge would prevent the expansion of the Central Powers toward the East and at the same time assure to Russia her legitimate access to warm water. For years, therefore, the question of these wedges has constituted the real *raison d'être* of the Near East in the world's politics—a *raison d'être* the importance and meaning of which has become more apparent to the everyday man since the outbreak of the war.

Inter-Balkan Relations

So much for the international reasons which have forced the Near East into prominence. From a local standpoint, and only to touch upon a

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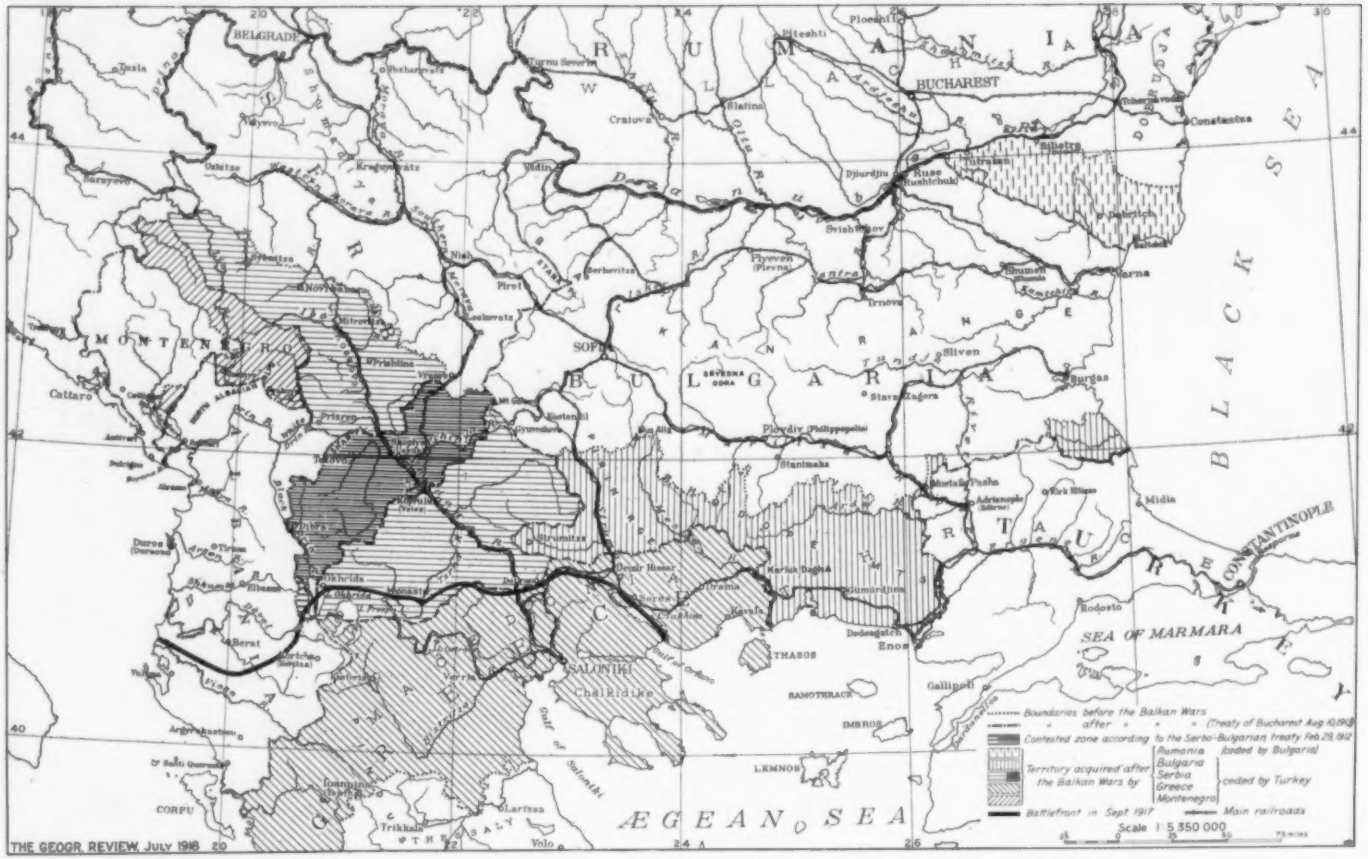


FIG. 1—Map showing territorial changes in the Balkan States in 1912-14 and the field of the present campaign. Scale, 1:5,350,000.

The darker ruled area, representing the contested zone according to the Serbo-Bulgarian treaty of February 29, 1912 (based on a map in "Report of the International Commission To Inquire into the Cause and Conduct of the Balkan Wars," Carnegie Endowment for International Peace, Washington, D. C., 1914, p. 45), was, except for its southernmost tip, acquired by Serbia after the Balkan Wars of 1912-13. The date of this treaty is given in Old Style; to correspond with the New Style notation of the Treaty of Bucharest it should read March 14, 1912.

problem of vital significance, the greatest difficulties of the Balkan question are due largely to the mixed nature of the population in many of the disputed areas and to the complicated nature of the geography of the country. Thus, while almost throughout what is known as Macedonia Albanians, Bulgars, Greeks, Serbs, and Vlakhs (Arumani) dwell intermingled in various proportions, nobody who has ever traveled there is able to consider that unhappy district as a concrete whole. He thinks of it as territory which is divided politically and geographically into watertight compartments, as a place inhabited by diverse populations, and as a locality possessed of well-defined if not adequately developed lines of communication.

The present seems a favorable moment at which to discuss some of the basic facts of the problems of the Near East and in particular for a review of the larger aspects of the Macedonian question and of the Saloniki campaign. In order to understand the many complications and ramifications of the Balkan question, it is necessary to refer at least to some of the events which preceded and immediately followed the Balkan Wars of 1912 and 1913. In 1912, largely as a consequence of the attitude of the Young Turks towards the subject nationalities of the Ottoman Empire in Europe, the Balkan Alliance was finally formed. I was in the East during the earlier part of the negotiations which led up to its formation and had the opportunity of discussing the question with most of the responsible ministers. I will therefore endeavor to remind my readers of some of the salient features of the two treaties or series of treaties of which Bulgaria was, so to speak, the central figure, and this because the arrangements consisted not of a triple alliance, but of a Serbo-Bulgarian and a Greco-Bulgarian treaty.

The Balkan Wars

Preliminaries to the First Balkan War

The Serbo-Bulgarian pact, in the shape of a treaty of alliance and a secret annex, was signed on March 14, 1912 (N. S.), as a conclusion of a series of negotiations following the outbreak of the Turco-Italian war. The treaty, which is published together with other documents by M. Guéchoff, former Bulgarian Premier, in his book on the Balkan league,[1] was defensive in character. It definitely guaranteed the support of each party to the other in the event of an attack by one or more states or in the event of any Great Power attempting to invade or annex any part of the then Turkey in Europe in a manner contrary to the vital interests of either party, and it bound the two countries not to conclude peace independently. The secret annex, which turned out to be more important than the actual treaty, foresaw the probability that internal or external difficulties in Turkey itself might render the maintenance of the *status quo* impossible and fixed the terms upon which action might then be taken. In addition it definitely

[1] I. E. Guéchoff: L'Alliance Balkanique, Hachette, Paris, 1915; reference on pp. 191-202.

FIG. 2—General view of Monastir. (Figs. 2-9 and 11 from photographs by the author.)

FIG. 3—The barracks and government buildings on the hill commanding and forming part of Üsküb (Skoplye).

decided the future distribution of any areas acquired either as a result of the defensive treaty or of what may be called the offensive annex. While all territorial gains were to constitute common property, Serbia recognized the right of Bulgaria to the territory east of the Rhodope Mountains and the Struma River, while Bulgaria recognized a similar right of Serbia to the territory north and west of the Shar Dagh. With regard to the area lying between these two boundaries, if the two parties became convinced that the formation of an autonomous province was impossible, then Serbia undertook to ask for nothing beyond a line drawn from Mount Golem on the northeast to Lake Okhrida on the southwest. Bulgaria promised to accept this line if His Majesty the Czar, who was to be requested to arbitrate, decided in its favor. While tentative negotiations between Bulgaria and Greece had taken place as early as May, 1911, these, as also the subsequent conversations, failed to materalize until after the signature of the Serbo-Bulgarian treaty. However, in May, 1912, the Hellenic Government agreed to the Bulgarian proposals, and a definite treaty was signed at Sofia on the 29th of that month.[2] That treaty guaranteed to each of its signatories the support of the other in case of war with Turkey, but it is important to remember that it made no arrangement whatever as to the future distribution of the territories to be acquired in a common war. With regard to Montenegro's position, an oral understanding was concluded between that country and Bulgaria in September, 1912.

Developments During the Balkan Wars

It is not within the scope of this article to enter into the events which immediately preceded or took place during the Balkan Wars. Sufficient be it to say that the first Balkan peace congress proved abortive largely because the Turks refused to agree to the Allied demands. During the first phase of the Balkan struggle, however, two important developments had taken place which were destined greatly to influence the future trend of events in southeastern Europe. I refer to the international crisis arising out of the attitude of the Dual Monarchy, secretly supported by Germany, upon the Adriatic question and to the differences that arose between Serbia and Bulgaria. The first of these questions led to the recognition of the principle of autonomy for Albania. This decision on the part of the London Ambassadorial Conference, whilst actuated by the fact that Austria "would not allow Serbia to reach the Adriatic," was undoubtedly justified by the existence of the Albanians as a nationality and by their desire for independent government.[3] It nevertheless entailed a great disappointment for Serbia and was partly responsible for the beginning of her bad relations with Bulgaria.

Early in February, 1913, and at the outset of the second phase of

[2] Guéchoff, *op. cit.*, pp. 223-228.

[3] See article by the author, "Albania and the Albanians," in the April *Review* (Vol. 5, 1918, pp. 257-273).

the first Balkan War, the relations existing between Bulgaria and Serbia were therefore far from satisfactory, and they continued to grow worse. Moreover there had begun a definite pegging out of Greek claims in Macedonia, together with negotiations between that country and Serbia for the purpose of the conclusion of a defensive treaty against Bulgaria. It was this last-named development in the situation that mainly brought about the estrangement, and particularly the fact that early in 1913, before the conclusion of the first Balkan War and on the initiative of Greece, these two countries, who previously had no direct obligations towards one another, entered into a secret arrangement in regard to the division of spoils secured from Turkey. The basis of that arrangement was that the Greeks would raise no objection to the Serbian retention of Monastir, allotted to Bulgaria by the Serbo-Bulgarian treaty of 1912, provided the Government of King Peter were willing to sanction the incorporation of Saloniki in the Hellenic Kingdom. That arrangement was followed by the more formal Greco-Serbian treaty, which we now know to have been signed on June 1, 1913, and therefore two days after the conclusion of the London Peace Conference.

It is not necessary to discuss here the arguments put forward by the various claimants prior to the outbreak of the second Balkan War, in which Rumania threw her lot against Bulgaria: we are rather concerned with its termination, the fatal Treaty of Bucharest.

The Treaty of Bucharest

That treaty, ignoring not only the political arrangements made before the first Balkan War but also the ethnical distribution of the Macedonian population, was arranged for the purpose of maintaining a so-called balance of power in the Balkans. But instead of achieving this object, the Treaty of Bucharest, favored as it was by Germany, together with the Turco-Bulgarian treaty of Constantinople (September 29, 1913), by which Adrianople and the surrounding country went back to Turkey, and the subsequent distribution of the Aegean islands by the Great Powers, led not to a settlement but merely to a holding in suspense of the numerous Near Eastern questions which had already been the means of shaking the European concert to its very foundation. It was certain that the losses then suffered by Bulgaria would lead her to seize the first opportunity to try to regain the territories which she coveted, either by peaceful negotiation or by war, and it was equally sure that Turkey and Greece would remain on bad terms as a result of the disappointments suffered by both countries in regard to the Aegean islands. It was this situation, together with the rivalry between Austria and Serbia, the disappearance of the Balkan league, and the partial rehabilitation of Turkey under the auspices of Germany that left the way open for and rendered possible the present war.

The Present War

The Attitude of Bulgaria: Its Significance

The developments in the East since the outbreak of the war may be described as having taken place in three stages. The first is defined by the arrival of the *Goeben* and the *Breslau* at Constantinople and the entry of Turkey into the war. That enemy success, which under the existing conditions could not have been prevented though it might have been foreseen by the Allies, carried with it the immediate acquisition by Germany of a fighting force which was employed to threaten the British in Egypt, Mesopotamia, and Persia and to endanger the Russian position in the Caucasus. But it did not and could not become possessed of its full results until unrestricted communication had been established between Central Europe and the Bosporus. While the Allies inaugurated the Dardanelles campaign in order to assist Russia and to try to prevent the achievement of this object, the enemy, recognizing the importance of Bulgaria and the attitude of that country towards the Macedonian question, devoted himself to her acquisition at all costs.

From the moment of the outbreak of the war, and particularly during this second stage in Balkan developments, that is the stage intervening between the entries of Turkey and of Bulgaria, the key to the situation in the latter country lay in the fact that King Ferdinand and his Government were determined to utilize the present conflagration in order to try to regain at least some of the losses suffered in 1913. For them this was not so much a European as a third Balkan War for the independence of Macedonia and of the Bulgars, subject to alien, this time principally Serbian and Greek, rule. It was certain, therefore, that they would give no support without the promise of a large section of southern Macedonia and also as a secondary condition the restoration of a section of the Dobrudja and at least part of the then Turkish Thrace. The bitter antagonism felt by Bulgaria towards Serbia, Greece, and Rumania and particularly towards the first-mentioned country, outweighed the traditional hostility towards Turkey. So long as her future was not adequately secured elsewhere, Bulgaria was unlikely to take up arms against Turkey because her only access to the sea was by way of her Black Sea ports, rendered useless owing to the closing of the Dardanelles, and through Dedeagatch, the railway to which port, according to the Treaty of Constantinople, ran for some miles through Ottoman territory. The great question, therefore, was whether Serbia, Greece, and Rumania would or could be persuaded to restore to Bulgaria areas of territory which she considered should be hers, and whether the Allies would guarantee her possession of districts of now Ottoman territory which they agreed should be alloted to her during the negotiations of the year 1913.

While, so far as I know, no detailed official statement was published on the subject, the conditions required by Bulgaria soon became pretty clear. On the west the Government of King Ferdinand was intent upon the

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 4—The Vardar River at Üsküb.
FIG. 5—Upper valley of the Kriva River, between Egri Palanka and the Serbo-Bulgarian frontier.
FIG. 6—The Serbo-Bulgarian frontier near the headwaters of the Pchinya R. (see Fig. 1).

recognition of the Serbo-Bulgarian treaty of March, 1912, as a basis for discussion. On the south, while claims were made to all the district lying between the Greco-Bulgarian frontier, the Struma valley, and the Aegean, satisfaction would probably have been provided by a rectification of that frontier in such a manner as to give to Bulgaria at least the whole of the Mesta valley and the port of Kavala. On the north, where in 1913 Rumania had claimed, secured, and afterwards seized territory on the south of the Dobrudja, the Bulgarian Government would undoubtedly have agreed to leave to that country the territory, including the town of Silistra, ceded to her by the Protocol of Petrograd in May, 1913, provided the more southerly area, actually seized by Rumania during the second Balkan War, had been restored to its former owners. With regard to the East and in Turkey, as there was obviously no question of negotiation with the Allies, the only feasible arrangement with Bulgaria would have been the giving of a free hand to occupy and retain a part of Thrace, say that situated northwest of the Enos-Midia line, and this I believe was done.

Importance of Bulgaria's Geographical Position

The enormous war importance of Bulgaria was and is bound up largely with her geographical position. As a result of the Balkan campaigns she became the only state with a frontier contiguous to that of Turkey in Europe and, therefore, the sole country which could attack or through which a land attack could be made upon the European dominions of the Sultan. Equally well, it was by way of Bulgaria alone that officers, technical experts, and supplies could be sent, as they were sent, from Central Europe to Constantinople. Owing to her central, or interior, position the value of Bulgaria was, therefore, out of all proportion even to the high fighting efficiency of her military machine. The position was important to both groups of Powers, but it was Germany who, realizing the necessity of preparing the way for action from the first, left no stone unturned to develop an already advantageous situation in order at least to maintain the neutrality and, if possible, to secure the support of Bulgaria and in the end wrung from Turkey concessions of the greatest value to the Government of King Ferdinand. These concessions, which took the form of the cession by the former country of the area of Thrace along the Maritza River through which the railway runs from Mustafa Pasha to Dedeagatch—an area now reported to have been given back to Turkey—were sanctioned by a preliminary agreement arrived at in July.

The position of the Allies, originally more difficult, gradually became far more complicated than that of the enemy. To begin with there was always Russia in the background, who, while supporting Serbia on the one hand, was regarded with actual suspicion by Bulgaria on the other. Moreover, where Germany was able to negotiate with one country, Turkey, for concessions to Bulgaria, it was necessary for England, France, Russia, and

later Italy to approach Serbia, Greece, and Rumania, against all of which countries the Government of Sofia had far-reaching claims. Consequently, when tardily and too late the Allies recognized the importance of Bulgaria, the ground for negotiation was extremely unfavorable, and that country had already set a price upon herself which it was far from easy to pay.

The Saloniki Campaign

The direct result of the Macedonian complications and of their non-solution by the Balkan Wars was therefore the entry of Bulgaria into the theater of hostilities, accompanied as it was by the inauguration of the Saloniki campaign. This campaign has been partly responsible for preventing the adhesion of Greece to the side of Germany during the reign of King Constantine, and it has prohibited the enemy from establishing many all-important submarine bases on the Aegean coast, results which themselves justify it. The restriction of its development may in large measure be attributed to the strategically favorable offensive and defensive positions of the enemy.

The Strategic Position of Bulgaria

In considering the first of these conditions, that is the offensive, it must always be remembered that the western frontier of Bulgaria runs practically due north and south and follows a line more or less parallel to but to the east of the great natural highway through the valleys of the Morava and the Vardar. These valleys, constituting the heart of Serbia and traversed by the all-important Nish-Saloniki railway, were open to attack by Bulgaria at several points. While in certain districts the distance to be covered on Serbian soil was about 60 miles, in others it was much less and in one place (just to the southeast of Demir-Kapu in the Vardar valley) the frontier approaches to within about five miles of the railway. Moreover the Bulgarians, who have always prepared for war not only by the training of an efficient army but also by the provision of effective communications, were possessed of roads and railways which enabled them rapidly to collect troops and to push them across the Serbian frontier. For instance, in addition to the main line from Sofia to Nish, there were the railways which run to Vidin and Berkovitza in northwestern Bulgaria and the line to Gyuveshevo on the frontier between Sofia and Üsküb. These lines, together with the available roads which cross the frontier and particularly with that which follows the valley of the Struma (down the greater part of which a railway has now been constructed), enabled the enemy rapidly to advance by numerous different and independent routes and to secure possession of the Vardar valley before the Allies could fight their way up into Serbia and before the army of that country was able to make good its retreat in a southerly direction. It was these facilities which forced the Serbs to retire towards the Adriatic instead

of towards the Aegean, which latter alternative, had it been feasible, would have been much easier and far less costly.

On the north and east of Saloniki, western Bulgaria is shut off from the Aegean by a strip of Hellenic territory annexed by Greece after the Balkan Wars. Measured from the Vardar valley on the west to the Greco-Bulgarian frontier on the east, it has a length of about 115 miles. Its average breadth from south to north is about 50 miles. Containing the port of Kavala and the towns of Drama, Seres, and Demir Hissar, a large proportion of this section of country, in addition to being strategically

FIG. 7—A street in Monastir.

important, is also rich. The Bulgarians, who, for these reasons, desired to reconquer it, were also favorably placed for the accomplishment of their object. They already held the Rhodope Mountains lying to the north and northeast, and they had an excellent line of advance by way of the Struma valley and a secondary means of communication by the Mesta valley route.

On the other hand the geographical and political conditions, which have been and are entirely against the Allies, are therefore favorable to the Bulgarians from the defensive standpoint. Passing over the difficulties of transportation, the lack of port facilities, and the original inadequacy of the roads and railways, this is largely due to the fact that the Allies' lines of advance into the interior are strictly limited. The enemy seized the greater part of the Vardar valley, which constitutes the only natural way into the interior, early in the campaign. For the Allies to drive him back

and to fight their way up this valley would have been a matter of the utmost difficulty inasmuch as the valley is narrow and very easily defensible.[4]

The Position at Saloniki

In the summer of 1916, when it was decided to put an end to the passive defense of Saloniki, two alternatives were open to the Allies—to endeavor to push forward either on the east or on the west of the Vardar. In the former area the principal feature affecting the relations of Saloniki to the interior and governing the direction of an advance from the Aegean coast

Fig. 8—The principal street in Saloniki.

into the heart of Old Bulgaria is the Rhodope Mountains, which extend from the Struma valley on the west to the Maritza River on the east. The western and central portions form one more or less definite line, but on the east this line divides into two long offshoots which enclose the valley of the Arda. The elevations attained at the western end of the range are considerably greater than those at the east. While in the former district there is the Mus Alla Peak (9,500 feet), situated a few miles to the east of the Struma valley, in the latter we have nothing higher than the Karlük Dagh (6,200 feet), located a few miles to the northwest of Gümürdjina. In order to penetrate the Rhodopes from the south it would be necessary either to approach and to occupy the plain which borders the Aegean from the west and therefore from the direction of Saloniki or to effect a fresh landing

[4] See D. W. Johnson: The Balkan Campaign, *Geogr. Rev.*, Vol. 2, 1916, pp. 27-47; especially pp. 43-44.—Edit. Note.

somewhere along the coast between that port and Dedeagatch, immediately west of the Maritza mouth. The former operation would be a dangerous one and one requiring a large force, for it would entail an advance by way of the Saloniki-Dedeagatch railway, which runs practically parallel to the front the enemy would undoubtedly establish more or less along the line of the Rhodopes. Fresh landings on the other hand would not only be beset by the heavy losses and the enormous difficulties which always go with such undertakings, but they would also be accompanied by dangers due to the fact that, except at Kavala, which has now no doubt been strongly fortified by the enemy, good landing places are not available.

The Allied commander therefore rightly decided not to attempt such an advance and chose for his push into the interior the section of country located to the west of the Vardar valley and lying more or less between Saloniki and Monastir or between the former town and the southern part of the Albanian frontier. The geographical and other conditions obtaining here have been and are in some ways more and in some ways less favorable to the Allies than are those existing on the other side of the Vardar. On the one hand, while there are the Moglena and other mountains on the Greco-Serbian frontier and while the country to the north and northeast of Monastir is very difficult, there are no barriers lying to the south and southeast of that town which compare in their strength to the Rhodope Mountains. Moreover Saloniki is connected with Monastir by a road and a railway. The road approximately follows the railway, which crosses the plain to Verria, where it begins to enter the hills. This line is of very great importance, not only because it gives access to Monastir, but because it runs more or less parallel to the Allied front.

So much for the favorable conditions in this area. From the opposite point of view it was here, during the period of her uncertainty, that the attitude of Greece so greatly complicated the Allied plan of campaign. On the east of the Vardar and in the Greek district enclosed by that river, the Rhodopes, the Bulgarian frontier, and the Aegean, there was the danger that the Greek forces would make no effort to resist an enemy advance. This indeed was what actually happened, but their strength was known and the sacrifice of that territory was not vital to the whole Allied position. Not so, however, with the area to the south of Monastir and to the west of Saloniki. There the facilities possessed by Greece for an advance against the left rear of the Allied position were such that had King Constantine thrown in his lot with the enemy, he was in a position so favorable as to enable him to jeopardize the entire British and French plan. Until the situation in Greece had been got in hand, therefore, these dangers prevented the inauguration of a plan which, up to the present, has only led to a more or less local success in the capture of Monastir. Yet it has none the less achieved important military and political results in that it has been the means of effecting the union of the Allied armies based on Saloniki

FIG. 9.

FIG. 10.

FIG. 9—A scene in the eastern Rhodope Mountains.

FIG. 10—The railway in the Vardar valley at the Demir Kapu gorge. This line is part of the through route from Central Europe to Saloniki.

with the forces of Italy landed on the Adriatic coast and in that it has wrested from Bulgaria a town whose political importance is unequaled elsewhere in Macedonia.

The Future of Macedonia

While it is impossible to forecast what may be the future of the Saloniki campaign, it is apparent that Bulgaria has conquered from her neighbors (except Turkey) and especially from Serbia the districts which she claimed and in some cases much more than she claimed prior to her entry into the war. In spite of this the future ownership of Macedonia depends not so much upon its present occupation as upon the general though not necessarily Balkan victory which will ultimately be won by the Allies and upon the distribution of territory then to be decided upon by them. The great question, a question which must be studied in advance, is therefore bound up with the solution of a problem which, if it be not settled as a result of the present war, will still endanger the peace of the world.

The Allies might decide to try to effect such a settlement by agreeing to continue the war not only until they were in a position to impose their terms upon the Central Powers, but also upon their smaller allies. So far as the Balkans are concerned, in addition to giving to Serbia and to Rumania those areas of Austria-Hungary which should undoubtedly be theirs, the adoption of this course would probably carry with it the practical disappearance of Bulgaria and of Turkey in Europe from the map, and it would mean the enormous enlargement of Serbia, Greece, and Rumania. In Macedonia this would mean the reversal of the policy of the principle of nationalities or of government with the consent of the governed. It would once more constitute not a settlement, but merely a holding in suspense of the settlement of this all-important problem. Hence we are compelled to look for an alternative carrying with it justice to all the Balkan nationalities and therefore the real establishment of peace—peace which in itself will go a long way to constitute an anti-German barrier in the Near East. The chief question to be decided is the true nationality of the peoples inhabiting doubtful or disputed areas.

In the case of Macedonia, and particularly so far as it concerns Serbia and Bulgaria, there are three ways in which the question of nationality can be settled—according to language, by taking a plebiscite, or upon the basis of a Serbo-Bulgarian treaty. If the first of these means were chosen the necessary measures would have to be taken to ascertain the areas of Macedonia in which the forms of speech particular to Bulgarians or Serbians are employed. Among the contributions to this question the information given by the Serbian "Balkanicus" in his book, "The Aspirations of Bulgaria,"[5] is most important, for he admits the post-position of the article in the Macedonian dialect. Though the author endeavors to

[5] Translated from the Serbian, Simpkin, Marshall, Hamilton, Kent & Co., London, 1915; reference on p. 222.

explain away this fact, his evidence is conclusive, for Bulgarian is the only Slav language in which the article is post-fixed.

In theory the taking of a plebiscite would be a satisfactory manner of arriving at a solution of the question: in actuality difficulties would arise. To enable the people to vote freely, a plebiscite could only be conducted under the direct auspices of the Allies or, better still, under the control of America. In such circumstances it is probable that the Serbians would lose heavily. If proof of this contention be required, it can be found in the various concessions made by the ex-Sultan Abdul Hamid and his prede-

FIG. 11—Bulgarian peasants on road approaching Küstendil.

cessors to the Bulgarian Exarchate; for the Turks have never admitted the jurisdiction of any Church in areas in which its members did not constitute an overwhelming majority of the population.

The third and last suggestion for a solution of the Macedonian question seems to be the one by far the simplest and fairest of adoption. It is the simplest because the Serbo-Bulgarian treaty of 1912 and its annex were arranged by the two contracting parties, without foreign interference, only six years ago and when the question was looming not in the distance but at a moment when a redistribution of territory was actually foreseen. To take that agreement as the basis for, though not necessarily the actual text of, a future arrangement would be the fairest settlement of the problem. It allots to Bulgaria far less than she would have got from the Treaty of San Stefano: the Serbians would probably secure from it a settlement much more favorable to them than any which could result from the language basis or from the taking of a plebiscite under the conditions

which I have indicated. Moreover under it there might be autonomy for the disputed areas.

There are questions connected with the future ownership of parts of Greece and of Rumania now occupied by Bulgaria. In regard to those areas annexed to Greece after the wars of 1912 and 1913, it must always be remembered that Venizelos was at one time in favor of the concessions necessary to secure the support of Bulgaria and that the Government of King Constantine, in opposition to the wishes of the Allies, voluntarily sacrificed large tracts of country to Bulgaria. The delimitation of the Rumano-Bulgarian frontier of the Dobrudja, of the Turco-Bulgarian frontier in Thrace, and of the boundaries of Albania would also be possessed of difficulties. But here again there are treaties or arrangements which might be taken as a basis for future territorial distribution. In the first case there is the agreement made between Rumania and Bulgaria by the Protocol of Petrograd: in the second there is the Treaty of London, which fixed the Enos-Midia Line as the European frontier of the Ottoman Empire, and in the third there is the European decision creating and bounding Albania—a decision which, while it should be modified in detail in favor of that country, none the less constitutes a groundwork for the future.

THE TURKS AND CAICOS ISLANDS, BRITISH WEST INDIES

By THEODOOR DE BOOY

The Turks and Caicos Islands, geographically, form a part of the Bahamas, which may be considered to extend from off the Florida coast to Navidad Bank, north of the eastern end of Haiti. Of the banks and islands resting on a submarine platform which constitute this island chain, they represent the last that rise above the surface of the sea. Beyond, to the southeast, lie three banks, the first two, Mouchoir Bank and Silver Bank, in part awash, the last, Navidad Bank, entirely submerged. While accurate data are not available to prove that these three banks are being uplifted, the mere fact that the Caicos Island Bank and many other banks in the Bahamas themselves are constantly building up, warrants the conjecture that the same tidal and geological conditions govern them all and that in the course of time three additional island groups will come into being.[1]

Settlement and History

The Turks and Caicos Islands owe their existence as a British colony to the salt ponds that are found upon the two principal keys of the group. It is probable that the archipelago was discovered within a short period after the coming of the *conquistadores* to the Americas.[2] The Indian population of the islands was carried off to slavery in the mines of Santo Domingo and suffered a fate similar to that of the inhabitants of the other Bahama Islands. The archeological researches conducted by the writer on the Turks and Caicos Islands demonstrated that the Turks Islands proper were not inhabited by the Indians, but that the Caicos Islands group supported a large pre-Columbian population.[3] This is not surprising when one considers the total lack of agricultural possibilities of the eastern group.

From the time of their discovery until the year 1678, the Turks and Caicos Islands appear to have been so little thought of that no nation saw fit either to claim or colonize them. In that year a party of Bermudians

[1] For a general discussion of the geology of the Bahamas see "The Bahama Islands," edit. by G. B. Shattuck and published by the Geographical Society of Baltimore, 1905, with excellent bathymetric map (Pl. X, facing p. 52); also T. Wayland Vaughan's numerous papers, more especially: Preliminary Remarks on the Geology of the Bahamas, etc., *Carnegie Inst. Publ. No. 182*, pp. 49-54.—Edit. Note.

[2] Oviedo ("Historia General y Natural de las Indias," Madrid, 1851 edition, Bk. 19, Ch. 15) enumerates the islands to the northwest of Porto Rico, after relating the voyage made by Ponce de Leon to Bimini and Florida (1512), and names the Babueca Islands as the first group one would meet with. The "Baxos de babueca" are prominently shown on the Wolfenbüttel-Spanish map, drawn between the years 1527 and 1530, and are shown as the southeasterly termination of the Islas de los Lucayos, i. e. the Bahamas (E. L. Stevenson: Early Spanish Cartography of the New World, *Proc. Amer. Antiquarian Soc.*, N. S., Vol. 19, 1909, pp. 369-419; reference on p. 380). It is therefore more than likely that the aboriginal name of the group was Babueca. The name Babueca appears on the Waldseemüller map of 1516; it is applied to a large island northwest of Hispañola.

[3] Theodoor de Booy: Lucayan Remains on the Caicos Islands, *Amer. Anthropologist*, N. S., Vol. 14, 1912, pp. 81-105.

came to the Turks Islands to establish salt ponds where they could "rake" this commodity in order to supply the needs of the colony.[4] These settlers did not occupy the Caicos Islands but confined their attention solely to the

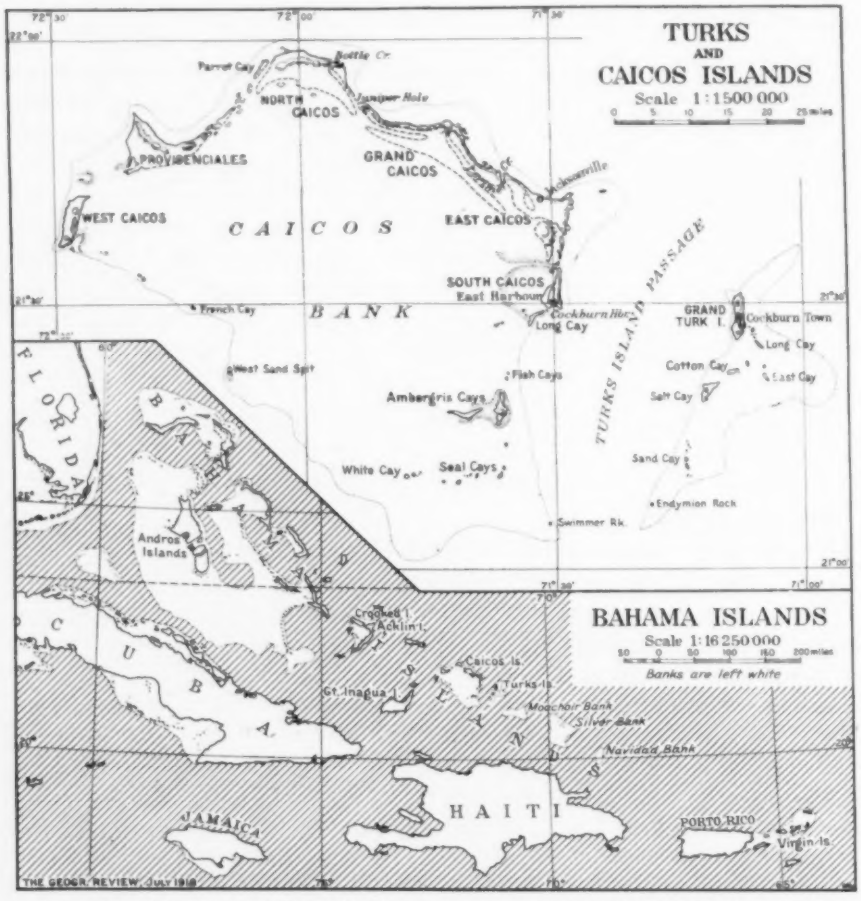


FIG. 1—Map of the Turks and Caicos Islands based on U. S. Hydrographic Office Chart No. 948 (June, 1915). Scale, 1:1,500,000. The inset shows the general location of the group and their relation to the Bahama Islands.

ponds they built on Grand Turk and on Salt Cay, coming here every year from March to November.

After building their ponds and establishing themselves, the Bermudians on the Turks Islands attracted the attention first of the Spaniards of Santo Domingo, who attacked them in 1710, and afterwards of the French in Haiti, who captured the islands in 1753 and again in 1764.[5] From 1764 on the

[4] F. H. Watkins: Report on the Salt Industry of the Turks and Caicos Islands, *Misc. Colonial Repts. No. 56*, London, 1908, p. 6.

[5] J. H. Pusey: The Handbook of the Turks and Caicos Islands, Kingston, Jamaica, 1897, p. 18.

Turks Islands have remained in undisputed possession of the British Crown. A direct result of the French invasions of the Turks Islands was the fact that the attention of the home government was drawn to the strategic importance of these hitherto unnoticed islands. In 1766 the Turks Islands were formally placed under the jurisdiction of the Bahaman government, it being justly urged that the southeasterly group was a geographic part of the larger archipelago. But in reality the two island groups had little in common. Legislation was conducted in the interests of the agricultural Bahamas: on the salt-producing Turks Islands the burdens of taxation fell heavily and with little compensation. Moreover, administration from Nassau labored under the disadvantage of poor communications, for winds and currents make navigation difficult between the groups.[6] In 1848, the Turks and Caicos Islands—the Caicos Islands by this time being a recognized part of the colony—were authorized to govern themselves, under the supervision of the Governor of Jamaica. From 1848 until 1874 the islands were controlled in this manner. The local method of governing did not prove a success, however, for the little colony was unable to support itself from the revenues derived from export taxes on salt. In consequence, on January 1, 1874, the Turks and Caicos Islands were formally declared to be a Crown Colony and a dependency of Jamaica, which status they have retained until the present day.

While the Turks Islands were from the first used solely for the exploitation of the salt, the Caicos Islands owed their settlement to the American War of Independence and to the agricultural establishments of the Loyalist refugees to whom lands had been granted there after the loss of their holdings in Georgia. These refugees, together with their numerous slaves, devoted their efforts exclusively to the raising of cotton. Successive hurricanes, and especially the great hurricane of 1813, together with the havoc wrought among the cotton plants by a destructive insect, put an end to the prosperity of the planters and caused the agricultural establishments to be gradually abandoned during the first twenty years of the nineteenth century. Shortly after this, the salt ponds of East Harbour, on South Caicos, were constructed, and it was speedily discovered that East Harbour would soon overshadow the other salt-producing settlements of the dependency.

The Turks Islands

As the Turks and Caicos Islands really consist of two distinct groups, separated by a 21-mile passage, it may be best to discuss the character of each group separately.

The Turks Islands group consists of the two larger and inhabited keys, Grand Turk and Salt Cay, four uninhabited keys and a large number of rocks. A three-pointed bank surrounds the group and offers serious dangers

[6] J. M. Wright: History of the Bahama Islands, etc., pp. 419-583 of first work cited in footnote 1.

FIG. 2—View of Cockburn Town, Grand Turk Island, from the east.

to navigation. This bank has been the scene of a large number of shipwrecks. The islands derive their name from the Turk's head cactus, a globular green plant surmounted by a scarlet head resembling the Turkish fez.

Grand Turk

The island of Grand Turk, with a population of 1,681,[7] of whom not less than 1,400 are of African descent, has an area of about eight square miles. The only settlement on Grand Turk, Cockburn Town, is situated on the western coast and contains practically the entire population. There is no harbor, and visiting vessels are obliged to anchor in an open roadstead and to remain a considerable distance off shore. In the stormy seasons not only does the exposed anchorage present grave dangers but the lightering of cargo becomes at times impossible. All freight is brought off to ships in lighters, for which two small piers are provided on the water front. At the present time but one steamship company calls at the island, although occasional freighters and sailing vessels come to load salt.

Grand Turk itself is one of the bleakest and barrenest islands imaginable. Its desolation is exceeded only by that of its neighbor, Salt Cay. The greatest elevation on Grand Turk is but 70 feet. Naught but the dwarfed shrub typical of the Bahamas is seen here, and such few trees as raise their disconsolate heads above the landscape have a dejected leaning towards the west, caused by the unceasing easterly trade winds. Of late the northern coast of Grand Turk has been utilized for the planting of sisal; but beside these plants, which seem to feed on nothing and yet produce leaves, no agriculture of any kind is found. Aptly enough the Turks Islands have been named the land of "salt, sand, and sorrow."

The climate of Grand Turk is good, the mean temperature being 82° F. Tempered by the constant ocean winds, the days are not oppressively warm. It is interesting to note the prevalence of the easterly winds. The winds recorded in 1916 were: north, 10 days; northeast, 72 days; east, 199 days; southeast, 51 days; south, 19 days; southwest, 2 days; northwest, 7 days; calm, 2 days.[8] The rainfall for the same year, which was near the average, was 26.37 inches. There are no fresh-water ponds or wells on the island, and the inhabitants have to depend entirely upon the rain-water tanks with which each house is provided.

A cable connects Grand Turk with Bermuda, Jamaica, and Halifax; and in consequence a number of steamers bound from England to Jamaica make a practice of passing close to the island in order that the lighthouse keepers may make out their signals and house flag and report them to the resident Lloyd's agent, who in turn cables the information to the owners in Great

[7] A. E. Aspinall: The Pocket Guide to the West Indies, London, 1914, p. 202. See also his "West Indies and Guiana: Six Lectures Prepared for the Visual Instruction Committee of the Colonial Office," London, 1914, p. 29.

[8] Turks and Caicos Islands, *Ann. Colonial Repts. No. 927*, London, 1916, p. 7. The deficiency of 3 days in the total for the year is probably due to a typographical error.

Britain. The cable company receives a small subsidy from the Turks Island government in exchange for a daily news bulletin.

The Salt Industry

There are two means by which the Turks Islands laborer can make a living. In the first place, he can hire himself out as a stevedore upon the ships of the Clyde Steamship Company which call at the island in order to procure men for the loading and discharging of freight in Dominican ports. Failing this, the Turks Islander finds work in the various operations of salt making. There are 230 acres of salt ponds on Grand Turk. As the *raison d'être* of the Turks and Caicos Islands is the production of salt and the very life of the colony depends upon this industry, it may be considered fitting to give a brief account of its principal operations.[9]

Salt ponds vary in size and are sometimes as large as five acres, while the pans are from one quarter of an acre to an acre in extent. The sea passes through sluices, entering by wide canals into the common storage reservoirs and then into the private reservoirs. The water now goes to the "weak or No. 1 pond" until the salometer indicates 60. In this pond a great deal of the impurities are precipitated, and the water turns a saffron hue. By the time the brine has reached the strength of 60, the water has been reduced in quantity more than one half of the original sea water, and it is now passed into the "strong or No. 2 ponds."

The brine stays in this latter pond for about twenty days, until the strength of the pickle has increased to 90. The pickle is now pink in color and but one-sixth part of the original sea water. Having reached a strength of 90, it is turned into the "making pans," where, after ten to fifteen days, the salt commences to granulate around the margins and bottoms of the pond. After twenty to twenty-five days more the salt is ready to be raked.

When all the salt has crystallized in the pans, it is gathered by men who first use toothed rakes for the separation of the crystals and afterwards wooden rakes to deposit the salt in small piles.

The average quantity of salt raked annually from an acre of pans at Grand Turk and East Harbour may, under favorable circumstances, be estimated at 4,000 bushels; at Salt Cay, where the pans are shallow, at 5,000 bushels.

Under average conditions the salt-pond proprietors can count upon a fair return from their holdings. But when the season is rainy vast quantities of the forming salt in the ponds are destroyed, and a large percentage of the deposits where the product is stored in enormous heaps literally wastes away. The average yearly rainfall is about 24.5 inches, and when this figure is exceeded (as it was from 1903 to 1905, for which years it averaged 40.80 inches) the results are disastrous to the proprietors. According to the authority quoted above, the average annual export of salt

[9] Summarized from Watkins, paper cited in footnote 4.

FIG. 3.

FIG. 4.

FIG. 3—The salt ponds, Grand Turk Island.
FIG. 4—Filling salt for shipment, Grand Turk Island.

during the period from 1888 to 1907 was 1,630,314 bushels, of which 77.6 per cent went to the markets of the United States and 16.1 per cent to Canada. The salt is of exceptional purity and is in great demand for packing purposes. In 1916 the export of salt from the dependency was valued at about $100,000, forming nearly three-quarters of the total exports.

Salt Cay and Other Keys

Salt Cay, the next largest island of the Turks Islands group, has a population of 398 and depends entirely upon the salt ponds, 120 acres in extent, for its existence. It is even bleaker and barrener than Grand Turk, and one wonders at the monotony of the lives of the few white inhabitants living here. The area of Salt Cay is about five square miles; its highest elevation is a 60-foot bluff on the northwestern extremity.

The remaining keys are uninhabited and have but little claim upon our notice. East Cay has an elevation of 96 feet and is the loftiest island of the entire group. Numerous rocks and shoals form part of the group and tend to make interinsular navigation a hazardous matter. Of these obstructions Endymion Rock recalls the loss of the British man-of-war *Endymion* in 1790.

The Caicos Islands

The Caicos Islands group is separated from the Turks Islands by a 21-mile passage, known as the Turks Island Passage. For small vessels this passage presents grave dangers. The seas are apt to run high, and the currents, which at times attain a rate of three knots,[10] are uncertain and variable, occasionally running northeast and at other times southwest. On approaching South Caicos Island a long land swell is experienced off Highland Point, which in stormy weather is responsible for the loss of many a local sloop.

Caicos Bank

The Caicos Islands surround the Caicos Bank, which has a triangular shape, the northern side being 58 miles long, the eastern side 39, and the western 56. The northern and eastern sides of the bank are bounded by a chain of narrow islands, while the western side is represented by a series of reefs and rocks. There can be no doubt that the bank will, in course of time, become one large island. Its interior is already represented by a low, salty plain, barely above sea level. An example of a bank that has grown up in this manner is seen directly to the westward, where Great Inagua Island presents every evidence that it originally consisted of a bank surrounded by reefs and keys. The interior of Great Inagua is a level, swampy savana, a casual inspection of which convinces the investigator that not many centuries ago the entire area was submerged. Another example of

[10] West Indies Pilot, Vol. 1, *U. S. Hydrogr. Office* [*Publ.*] *No. 128*, Washington, 1913, p. 198.

an island in the making can be seen to the northwest, where Crooked Island, Acklin Island, and Fortune Island surround the Acklin Island Bank. This bank is yearly becoming shallower and in time will merge with the three islands.

Its Shoaling

All evidence points to the constant shoaling of the Caicos Bank. Historical accounts of the pursuit of piratical craft across the bank by men-of-war in the eighteenth and the early part of the nineteenth century indicate that even a hundred years ago deep channels existed where today a vessel drawing but six feet of water has to proceed with caution. A channel across the southern part of the bank, reported to be 14 feet deep in 1881, was followed by the writer in 1912 in a vessel drawing 6½ feet. Soundings made at that time showed the channel to have shoaled to such an extent that in places barely 9 feet of water was found. The creeks dividing the islands from Grand Caicos to South Caicos are fordable, and a man can proceed afoot from the one island to the other. Yet it is within the recollection of the older inhabitants that vessels of good size could reach the inner waters of the bank by passing between any two of the islands lying within the described limits. The entire range of islands from South Caicos west to West Caicos is fringed by a highly dangerous coral reef, lying from half a mile to two miles off shore. Occasional openings in this reef allow the mariner to anchor off the northern shores, but only in calm weather do these berths offer any security. A curious phenomenon, which probably accounts for the constant upbuilding of the Caicos Bank, is the indraft into the bights which is felt for a distance of from five to six miles out at sea and is a grave source of danger to a becalmed sailing vessel.[11] Juniper Hole, between Grand Caicos and North Caicos, bears an especially bad reputation in this respect and in consequence is shunned by local boats. Experienced boat handlers of the Caicos state that the smaller sailing craft, when they are becalmed, are literally drawn toward the rocks fringing this particular inlet and dashed to pieces. It appears to be well within the bounds of reason to suppose that this indraft carries enormous quantities of sand from the Atlantic, through the interinsular channels, to the bank itself and is in consequence responsible for the constant shoaling of its waters. The surrounding coral reefs act as traps to prevent the washing away of the deposits, and, as these reefs are also constantly being built up by the activities of the coral polyps, it will be seen that every indication points towards the probability of island growth. It must be stated that these phenomena do not account for the original formation of the Caicos Islands themselves. This may have been due to uplift, judging from the waterworn caves found in the limestone ridges throughout the keys.[12]

[11] West Indies Pilot, Vol. 1, p. 189.

[12] Compare, however, the section on Physiography and Geology by G. B. Shattuck and B. L. Miller in the first work cited in footnote 1.—Edit. Note.

Population and Industries

Except by government officials, who are obliged to make periodic inspection trips, the Caicos Islands are but seldom visited and remain comparatively unknown. The literature pertaining to them is almost negligible. Even the origin of the name remains unknown, although local accounts intimate that Caicos was derived from the Spanish word *cayos* (keys, little islands). The area of the islands is about 151 square miles, although accurate surveys of the islands and more especially of the inner shore lines have never been made. The population amounts to 3,536 souls, of whom fully 95 per cent are of African descent. The greater number of the inhabitants live on South Caicos and on East Caicos, where the salt and the sisal industries provide work for numerous laborers. The climate is practically the same healthful climate as that of the Turks Islands. There are, however, certain localities on North Caicos where the inhabitants suffer a good deal from malarial fever. As on Grand Turk and Salt Cay lack of water is the principal drawback, and the population here also has to depend entirely upon rain water stored in tanks.

Sponges

Despite the fact that some of the Caicos Islands have decided agricultural possibilities, the majority of the inhabitants make their living off the sea. At one time the Caicos Bank was famed for the quantity and the quality of sponges that grew in its shallow waters. Owing to a shortsighted policy on the part of the government, which allowed these marine growths to be fished at all seasons, they have practically become exhausted; whereas in 1901 sponges were shipped to the value of over $44,500, exports of sponges in 1916 amounted to only one-ninth as much. Of late years efforts are being made to grow marketable sponges from clippings on concrete disks. These attempts are carried out in two of the creeks on the islands of Providenciales and South Caicos and from all indications ought to prove a success. A "live" sponge is cut up into small pieces the size of a walnut. These pieces are then fastened to a concrete disk and placed in the water. In three or four years a sponge of marketable size has grown from the clipping and can be detached from the disk. Sponges produced by this method have the advantage of not needing to be "clipped," i. e. the part of the sponge where it was attached and where small particles of coral have become imbedded in its growth need not be removed with shears. Furthermore, in growing sponges by this method, it becomes possible to select only the more valuable varieties for propagation, such as the reef sponges and the sheep's-wool sponges.

Conchs

The conch (*Strombus gigas*) is found in large quantities in the waters surrounding the Caicos Islands. Not only does this animal form a staple

FIG. 5.

FIG. 6.

FIG. 5 Sisal fiber being dried on a series of low walls made from coral rock, East Caicos Island. Flamingo Hill in background.

FIG. 6—Field of sisal plants and warehouse, East Caicos Island.

in the dietary of the inhabitants but it is also extensively exported to the neighboring island of Haiti, where the sun-dried meat is in great demand. In 1916 dried conch meat to a value of some $8,000 was exported. The lips of conch shells have always been in great demand in the cameo-cutting trade, owing to the contrast between the white, outer and the pink, inner shell. Until lately it was customary to ship the entire shell of the animal, the purchaser having to cut off the lip and throw the rest away. For the last few years the cutting up of the shells has been done locally, thereby effecting an immense saving of space in the shipments. A not inconsiderable revenue is derived from these sources. The conch also occasionally produces pearls which are sold at good prices.

Other Industries

Salted and dried fish are consumed locally and exported to Haiti and to Santo Domingo. Turtles are caught in the waters surrounding the keys but are used mostly for local consumption, since laws were passed in the United States requiring that turtles be shipped in tanks instead of on their backs as was formerly done. The spiny lobster (*Palinurus vulgaris*) is abundantly found on the rocky shoals of the Caicos Bank, and a small cannery at Chalk Sound on the island of Providenciales exports a limited quantity of this sea food.

The two principal exports from the Caicos Islands are salt and sisal. As has been stated, the methods in vogue for the production of salt on South Caicos do not differ materially from those employed on Grand Turk and on Salt Cay. The ponds of South Caicos, with an area of 400 acres, are larger than those of Grand Turk and of Salt Cay combined. Practically all the sisal fiber exported from the dependency comes from the large plantation on East Caicos. The value of the exported product amounted to nearly $16,000 in 1916, and it is believed that the value of the exportation in 1917, owing to the increased price and to a better crop, greatly exceeds this figure.

Efforts are being made by the local government to encourage the growing of cotton on the Caicos Islands. Soil and climatic conditions are excellent for this purpose, and the cotton raised in past years is one of the highest-priced varieties on the market. Since modern science has found means to combat the injurious insects which prey upon the plants and which in the past were responsible for the failure of the Loyalist refugees, it is quite possible that several of the Caicos Islands may find their agricultural salvation in this manner. In fact, it is thought by some that the possibilities offered by cotton cultivation on these islands are unlimited and that in time the cotton industry may overshadow the somewhat uncertain salt industry.

South Caicos Island

South Caicos is the seat of government for the Caicos Islands group and possesses the largest settlement, called in official parlance Cockburn Har-

bour, though generally known and referred to as East Harbour. The settlement has a fairly secure anchorage for large vessels between South Caicos and Long Cay and in consequence possesses a decided advantage in this respect over Grand Turk or Salt Cay. East Harbour has a population of about 1,200 inhabitants. The highest elevation on South Caicos is about 110 feet. The island depends entirely upon its salt industry and is barren and unproductive.

East Caicos Island and Its Sisal Cultivation

East Caicos is exclusively devoted to the raising of sisal plants and the production of fiber. The main settlement of the East Caicos Fibre Company, which has over 3,000 acres in cultivation, is found at Jacksonville, on the northern coast. The estate employs several hundred laborers, who come from all parts of the Caicos Islands to find employment. A mule-drawn railway for transporting the sisal leaves connects the factory with the fields.

Sisal plants (*Agave regida*) were introduced many years ago in the Bahamas, probably from Yucatan, as the Bahamas and the Caicos Islands sisal is the same as the well-known henequen from the latter region. The barren Bahamas and the Caicos Islands are ideally fitted to produce sisal. This plant flourishes on soil that is dry and rich in lime; it does better on poor soil than on fertile. In fact, the poorer the soil, the longer the life of the plant. Where a plant will "pole," i. e. grow its flower stalk (with which its productivity ends) after but three years on fertile land, this "poling" will be delayed in plants grown on poor soil. In consequence, the harvest of leaves cut from the plants will be perhaps five times as large. From the Bahamas the sisal plants were first introduced on West Caicos, where an English company leased land from the government and erected a factory. For various reasons this factory failed. The plantation on East Caicos was started in 1882 and possesses up-to-date machinery for the extraction of the fiber. The leaves, from three to six feet in length, are cut periodically, and special decorticating machinery extracts their white fiber. This fiber is then carried to a series of low walls, built of coral rocks, where it is dried in the sun. Once dried, the fiber is baled under hydraulic pressure and shipped to foreign markets, where it ultimately is made up into rope, binder twine, etc.

There is an exposed reef-harbor at Jacksonville, where the local boats find a fairly secure shelter. The highest elevation on the island is Flamingo Hill, 270 feet high.

Grand Caicos Island

Grand Caicos is the largest island of the group. There are two settlements on the eastern side of the key, Bambara and Lorimers, while the fishing villages of Conch Bar and Ferguson's Point are found on the northwestern point. These settlements are not large in extent and consist of collections of miserable huts. The inhabitants eke out a precarious exist-

ence by fishing and agriculture. It is doubtful if more than 200 people live on this unproductive key.

North Caicos Island

North Caicos is the most fertile of the Caicos Islands group, and timber is found on it of sufficient size for building small local sailing vessels. Agriculture provides the inhabitants with a living, and the larger part of the products raised are shipped to South Caicos and Grand Turk. Nevertheless the people are miserably poor and not infrequently have to apply to the government for relief. A number of settlements are found on Bottle Creek, the inlet separating Grand and North Caicos. These are Bellevue, Windsor, Readymoney, and Lockland; they derived their names from the Loyalist plantations that were once found here. None of the settlements consist of over twenty houses and huts. Nearby are found the ruins of former plantations, frequently imposing in size and indicative that the Loyalists enjoyed considerable prosperity and possessed large numbers of slaves. Near the southern coast of the island is found the larger settlement of Kew with perhaps 300 inhabitants and the ruins of an ancient sugar factory. Altogether the island supports a population of about 1,200.

Providenciales Island

Numerous small keys are found in the passage between North Caicos and the island of Providenciales, and on these one or two sponging stations are located. The sponge fishers come here with their catch from the bank and sell the sponges to dealers, who prepare them for the market. The northwestern cape of Providenciales presents a grave danger to sailing vessels bound through the Caicos Passage southward, as the cape is frequently mistaken for the neighboring island of West Caicos. Wrecks in consequence are not uncommon on the reef opposite this point, and the natives of Providenciales derive no small income from the misfortunes of the mariners. Providenciales has the highest elevation of all the keys in the dependency, the Blue Mountain being 280 feet high. The natives make half-hearted attempts at agriculture and raise enough to avoid actual starvation. Their principal occupation, however, is that of fishing for sponges and waiting for remunerative wrecks. The population of the island is about 600. Near West Harbour Bluff, to the east, is found the sea inlet called Chalk Sound, where efforts are being successfully carried on to grow sponges on concrete disks. At the mouth of this inlet is also found a small lobster cannery.

West Caicos Island

West Caicos was formerly known as Belle Isle and is separated from Providenciales by a boisterous, shallow, five-mile wide passage. The highest elevation of West Caicos is but 65 feet. At one time attempts were made to lay out this key in salt ponds, but the enterprise failed. In 1880 a com-

pany was formed with the intention of cultivating sisal on the island. For a time these efforts were productive, and one of the steamship companies trading in the West Indies made the key a port of call for its cargo steamers. It is doubtful if today the total population of West Caicos exceeds 40 inhabitants. A curiosity found on West Caicos is the "boiling springs"—salt-water lakes which have a subterranean connection with the sea and rise and fall with the tide. Delvin's Cove, on the northern coast of the island, is a rocky inlet in which the notorious pirate Delvin was accustomed to hide his vessel, tying branches and trees to his masts in order to screen his ship from observation. When his lookouts on Providenciales signaled the approach of a harmless West Indiaman, the pirate lost no time in warping his craft from its hiding place and giving pursuit.

Other Keys

From West Caicos to South Rock, the Caicos Bank has a southeasterly trend and is bordered by a continuous line of rocks and breakers. French Cay and West Sand Spit are the only keys that are of any size. The former is frequently visited by fishermen during the nesting season, when thousands of eggs of aquatic birds can be collected. White Cay and the Seal Cays, together with numerous outlying rocks, form the southern extremity of the bank. From Swimmer Rock the bank runs due north, with the Ambergris Cays, Fish Cays, and Long Cay as its eastern boundary, until South Caicos is reached. All these keys are uninhabited.

THE PEOPLES OF AUSTRIA

By B. C. WALLIS

[With five separate maps, Pls. I–V, facing p. 64.]

Physical Configuration of the Country

Physically Austria is a congeries of fragments. Mountain, plateau, plain; the shining glories of the Eastern Alps, the desolate barren nudeness of the Karst; unhealthy coastal lowlands, healthful hill resorts—all are represented, but without connection, without either unity or cohesion. The shape of the country is that of a cross made by crooked unequal bars (Pl. I).

Eastern Alps

The southwestern mountain area comprises the major portion of the Eastern Alps; Vorarlberg, Tyrol, Salzburg, and Carinthia are mountain provinces where extensive areas lie more than a mile above sea level. The peninsula of Istria and the neighboring province of Gorizia and Gradisca, together known as the Küstenland, contain a part of the alluvial lowland which is characteristic of the northern end of the Adriatic Sea. In Dalmatia a piece of the Dinaric Alps drops steeply to the shore, and the coast is fringed by numerous islands which lie parallel both to the coast and the mountain ridges; the harbors lack facilities for the development of inland traffic with the Balkan States, and Dalmatia is isolated, so that these sheltered waters are but the havens of an industrious fishing population. Here, and again in Istria, are bits of the Karst district, with rivers which tumble down swallow holes and vegetation patches which break off abruptly where the limestone yields a deficient supply of water. In Carniola and Styria there are Alpine forelands where the rivers Mur, Drave, and Save flow eastwards to the lowlands of Hungary; the western and mountainous portions of the valleys are typical longitudinal valleys of the Eastern Alpine system, and only when the rivers approach closely to the Hungarian boundary do the valleys broaden out into plains. These are flooded when the rivers are reinforced from the melting of the snow and form typical marshy alluvial lowlands.

Carpathian Foreland

In Galicia and Bukovina a portion of the Great European Plain adjoins the Carpathian forelands. In the east of this region rivers like the Dniester rise near the Carpathian crests, flow quickly to lower levels, and wind in trenchlike valleys eastwards, thus forming a part of the drainage system of the Black Sea. In the west many streams flow northwards from the Carpathians to the Vistula, while the San and the Bug have their origin

in the plains, so that the area belongs to the drainage system of the Baltic Sea. Neither mountains nor rivers give this long narrow portion of the Austrian cross a distinct individuality.

Bohemian Plateau

The nearest approach to a geographical unity occurs in the plateau of Bohemia, which consists almost entirely of the basin of the upper Elbe and so drains northwards to the North Sea, downhill from Vienna. The only entrance to Bohemia at a lower level than 1,000 feet above the sea is the gateway through which the Elbe escapes from the plateau, almost the most northerly point of Austria. The small province of Silesia is split into two portions by an extension of Moravia. The eastern bit is similar to western Galicia; the western piece is mainly a projection of the mountain rim of the plateau of Bohemia; between them the Oder escapes from Austria towards the Baltic Sea. Southwards from this narrow passage between the heights of Bohemia and the northwestern Carpathians, the Moravian Gate, the province of Moravia occupies the basin of the upper March, which contributes its flood to the Danube. The lower March forms a bit of the Hungarian boundary, so that only the western portion of its valley is Austrian, in the province of Lower Austria. Finally, Lower and Upper Austria are a transitional land, in which lies the Austrian fragment of the Danube. This area connects the wide German upper Danube valley with the wider and lower Hungarian Danube lowlands. At the eastern end the basin of Vienna resembles the Little Alföld of western Hungary.

Austria a Part of the European Isthmus

Europe is physically a peninsula of Asia, and Austria forms a part of the isthmus between the Baltic and Adriatic Seas. The land slopes downwards in opposite directions in the north and south, and the intervening mountain area turns the face of the country eastwards, with an eye—the basin of Vienna—looking towards Slavdom and the continental East and away from Western Europe and the lands beyond the ocean.

The southern Tyrol—the basin of the upper Adige—Bohemia, similarly a river basin, and Bukovina illustrate the detached nature of the Austrian fragments and by their drainage to different seas accentuate the divergence in outlook of the Austrian Empire.

Austrian Official Statistics

The maps which are here presented bring the facts concerning the peoples of Austria into line with those regarding the peoples of Hungary, which formed the subject of a previous article,[1] but it is necessary to indicate an essential difference between the official publications of the separate parts of the Dual Monarchy. In the case of Hungary the details concerning the

[1] B. C. Wallis: The Peoples of Hungary: Their Work on the Land, *Geogr. Rev.*, Vol. 4, 1917, pp. 465-481.

population are so voluminous that it only requires time and patience to elicit the facts in almost any line of inquiry, whereas the Austrian publications become the more baffling as one's investigations proceed. This fact is of considerable importance in view of the frequency with which the accuracy of official population statistics is called into question; for the Hungarian publications provide adequate material for the publicist who wishes to demonstrate the falsity of the official figures, while the Austrian publications are not nearly so open to investigation. The statistics concerning the Austrian villages are hidden away in a *Gemeindelexikon* parts of which only have been available to the writer; but the absence of details for small areas is not so serious in the case of Austria as it would be in the case of Hungary, for in the western country the nationality boundaries tend to coincide with the boundaries of the administrative division, whereas in Hungary they usually cut across the boundaries of the counties. For instance, it is obvious from a glance at Table I (p. 57) that there is not much room for any but German villages in Salzburg, and in areas of two nationalities like Bohemia the *Gerichtsbezirke* are usually predominantly of one nationality. In official summaries and discussions of the Austrian census returns the basis of examination is not national but geographical; for example, Gorizia and Istria are frequently grouped together as the Küstenland. The North Slav group of the Czechs, Moravians, and Slovaks, who combine to form the bulk of the population of Bohemia and Moravia, is always lumped together, so that it is not possible, for instance, to discover how many Slovaks there are either in Moravia or in Vienna if one wishes to test the assertion that many Slovaks move across the frontier from Hungary into Austria.

Austrian vs. Hungarian Statistics

It is possible to give an apposite illustration of the difference between the Hungarian and the Austrian published returns. It has been alleged on the one hand that the Hungarian census fails to register the total number of Rumanians in Transylvania and on the other hand that the Austrian census does not record the total number of Ruthenians in eastern Galicia. In the first case the argument is based upon the assertion that there are no Magyar Uniates, and in the second case that there are Ruthenian Roman Catholics. In Transylvania the records show a larger total of Uniates than the combined totals of the non-Magyar races who are known to be Uniates; hence it is argued, on the assumption that there are no Magyar Uniates, that the excess of Uniates must be really Rumanians who are not officially recorded as Rumanians. In the case of Galicia the total number of Ruthenians recorded agrees with the total number of Greek Catholics, while the total number of Poles recorded agrees with the number of Polish Jews combined with the number of Roman Catholics; hence, it is concluded, on the basis of the statement that there are some Ruthenian Roman Catholics, that the number of Poles on record exceeds the actual number of Polish inhabitants

in eastern Galicia, and that the recorded number of Ruthenians is smaller than it should be. Each of these arguments depends upon a precise statement. In the case of Transylvania the statement may be immediately disproved: the records show that there are Magyar Uniates; in the Austrian case, similar records fail to indicate any satisfactory fact, because the religious groupings of the Ruthenians does not distinguish between Roman and Greek Catholics, and thus does not show whether there are, or are not, any Ruthenian Roman Catholics; and the investigator is baffled. All that he can find out is that the Ruthenians of Bukovina are Greek Orthodox and that the Ruthenians of Hungary are Greek Catholics.

The Distribution of the People

In the main the distribution of the people of Austria is inverse to the elevation of the land. The high mountains and the lower highlands are scantily peopled (Pl. II). The lowland strip near the Adriatic is more densely peopled; the eastern edges of Styria and Carinthia carry a population intermediate in density. In Galicia the area of densest population is, however, not the lowest land; the chief grouping of the people is along the middle of the country, with fewer people along the northern riverine lowlands and along the Carpathian slopes to the south. From the Moravian Gate westwards to the northwest corner of Bohemia the population on the slopes is in striking contrast to the population on the slopes of Galicia and of Dalmatia; in Bohemia there are stretches of hill country with a population which exceeds 640 per square mile (Pl. II). The southwest hills of Bohemia carry as many people as the Carpathian slopes. Moravia is well peopled, especially in the central portion. Probably nothing illustrates the comparative unimportance of the passageway of the Danube so well as the paucity of the population, even in the neighborhood of Linz and Vienna, in comparison with the denser population along the Elbe and around Prague in Bohemia. The most notable fact concerning the distribution of the inhabitants is the long narrow belt of dense population which stretches roughly along the parallel of 50° N. from 12° E. to 26° E., i. e. for more than 500 miles. This band of people is separated from Hungary and the south of Austria by the mountains and is continuous beyond the limits of Austria both westwards into Germany and eastwards into Russia.[2]

The Distribution of the Nationalities

Racial Heterogeneity

Plate III shows the patchwork of races of which Austria consists. There is no Austrian race, and every race represented within the empire extends beyond Austrian limits. From the Danube lands of South Germany the

[2] This relation is well brought out on L. Weise's population density map of Europe, 1:10,000,000 (*Petermanns Mitt.*, Vol. 59, I, 1913, Pl. 2; generalized in 1:42,000,000, *Bull. Amer. Geogr. Soc.*, Vol. 45, 1913, p. 668).—Edit. Note.

Germans extend across Austria into Hungary between the Danube and the Mur and reappear in islands farther east near the Danube and in Transylvania. In southern Austria the Italians reach into Tyrol, Gorizia, and Istria, while Serbo-Croats from the east overflow down the slopes of Dalmatia to the Adriatic, and even into the east of Istria. In the northeast the Rumanians extend some distance up the rivers into Bukovina; the Ruthenians flow up the Carpathian foreland and lap over the crest line of these mountains into Hungary. The Poles stretch from beyond the Vistula southwards to the crest line of the Carpathians and provide the only instance where a linguistic boundary coincides for many miles with the political frontier. From the Moravian Gate westwards the Germans reach down the inner slopes of the northern hills to the lowland. All these races are represented in Austria by minorities of the totals of the respective race groups. Even the Slovenes in the south are a fragment of the South Slavs, who are represented in Hungary, Bosnia, and Serbia by the Serbs and Croats. The Czech group of North Slavs—Czechs, Moravians, and Slovaks—is, however, confined to Austria-Hungary, with the majority in Austria.

Racially, then, Austria differs from Hungary because there is no race similar to the Magyars centrally situated and different in character from the other races of Western and Central Europe, and because the Austrian races are more compactly knit; for the only islands of any importance are the German islands in the south of Carniola among the Slovenes and in the north among the Czechs.

Racial Distribution and Population Density

The Germans live in areas of scattered population except along the populous borders of Bohemia and eastern Silesia. The belt of dense population along 50° N. includes Germans on the western border, Czechs, Moravians, etc., to the Moravian Gate, Poles in Galicia, and Ruthenians, with Polish islands, in the east. The Slovenes occupy the area of moderate population on the Alpine forelands in Carniola and reach as far west as the environs of Trieste, which, like Fiume, is a port mainly inhabited by Italians and surrounded by Slavs. The Italians inhabit the scantily peopled southern Tyrol, where they tend to push up the valleys, and the more densely peopled coastal plains of Gorizia and Istria. The Serbo-Croats (for the Austrian census returns do not distinguish between Serbs and Croats) inhabit sparsely populated Dalmatia, the east of Istria, and the coastal islands.

The Jews

Plate III does not provide any indication of the distribution of the Jews, since the Jews are officially recorded among the religions and not among the races. They form 9 per cent of the population of Vienna, 1 per cent in Bohemia, 2 per cent in Moravia and Silesia, 11 per cent in Galicia, and

13 per cent in Bukovina. One-third of the Jews are classified as Germans by nationality, just over a half are Poles. In Galicia and Bukovina three-fifths of the official Germans are Jews, and in Galicia one-sixth of the official Poles are Jews.

Demographical Conditions

The total Austrian population of 28,500,000 is distributed among the provinces as indicated in Table I, where it is shown that of 17 provinces four are definitely German, one Slovene, and one Serbo-Croat.

Table I—Population, Nationality, and Religions

Province	Population in thousands	Percentages					
		Religion		Nationality			
Lower Austria	3,532	96%	Roman Catholic	96%	German	.....	
Upper Austria	853	97	" "	100	"	.....	
Salzburg	215	98	" "	100	"	.....	
Styria	1,444	98	" "	71	"	29%	Slovene
Carinthia	396	94	" "	79	"	21	"
Carniola	526	100	" "	94	Slovene	.....	
Trieste	230	95	" "	62	Italian	30	Slovene
Gorizia	261	99	" "	62	Slovene	36	Italian
Istria	404	99	" "	44	Serbo-Croat	38	"
Tyrol	947	99	" "	57	German	42	"
Vorariberg	145	98	" "	95	"	.....	
Bohemia	6,770	96	" "	63	Czech	37	German
Moravia	2,622	95	" "	72	"	28	"
Silesia	757	84	" "	44	German	32	Pole
Galicia	8,026	47	" "	59	Pole	40	Ruthenian
Bukovina	800	68	Greek Orthodox	38	Ruthenian	34	Rumanian
Dalmatia	646	83	Roman Catholic	96	Serbo-Croat	.....	
Total	28,574						

Natural Increase and Migration

The values given in Table II are obtained from the examination of sample areas where the people are definitely of the nationality specified. The German birth rate is about 30 per thousand per annum and the death rate about 22, which gives an average rate of natural increase of the population of about 8 per thousand per annum. The German population does not increase uniformly at this rate, since it is disturbed both by internal migration and by emigration. The net results of these movements of the people are shown in the column headed "Migration." The Germans increase by migration in Lower Austria, Salzburg, and Styria, and these are the only instances in Austria of this kind of population increase.

The Slovene birth and death rates are approximately 36 and 24 respectively, which gives a rate of natural increase of 12, which is one and a half times that of the Germans. The Slovenes are diminishing by a migration outwards which is roughly equal to two-thirds of the natural increase.

The rate of natural increase of the Serbo-Croats (14 per thousand) is higher, and the migration is on a smaller scale than that of the Slovenes, so that the Serbo-Croats are tightening their hold upon their lands more definitely than the Slovenes.

The Italians are prolific, and, since the death rate is equal to that of the Slovenes and Serbo-Croats, the rate of natural increase is higher, being in fact almost double that of the Germans. The migration outwards is comparatively small, but indicates curious differences, for in Istria it is less than that of the Serbo-Croats, in Gorizia it is less than that of the Slovenes, but in the Tyrol it is greater than that of the Germans.

TABLE II—NATURAL INCREASE, MIGRATION, AND ILLITERACY BY RACES

PROVINCE	MEAN ANNUAL RATES PER 1,000 OF THE POPULATION				PERCENTAGE OF POPULATION OVER 6 YEARS OF AGE ILLITERATE
	BIRTH	DEATH	NATURAL INCREASE	MIGRATION	
Sample German areas					
Lower Austria	28	20	8	+5	5
Upper Austria	30	23	7	−2	5
Salzburg	31	23	8	+2	7
Carinthia	32	23	9	−3	21
Styria	28	22	6	+2	12
Tyrol	30	22	8	0	4
Vorariberg	29	19	10	−2	2
Bohemia, Moravia, Silesia	31	22	9	−4	4
Sample Italian areas					
Istria	41	24	17	−5	65
Gorizia	38	20	18	−1	32
Tyrol	34	23	11	−6	7
Sample Slovene areas					
Carniola	35	25	10	−7	22
Styria	33	22	11	−8	20
Gorizia	45	25	20	−14	24
Sample Serbo-Croat areas					
Istria	38	22	16	−9	77
Dalmatia	38	24	14	−5	73
Sample Czech areas					
Bohemia	31	21	10	−5	4
Moravia, Silesia	37	22	15	−7	4
Sample Polish areas					
Silesia	38	26	12	−1	8
Galicia	40	23	17	−10	42
Sample Ruthenian areas					
Galicia	45	30	15	−4	80
Bukovina	42	29	13	−9	73

Among the Czechs the rate of natural increase is about 12 per thousand, owing to lower birth and death rates than prevail among the Slovenes. Since the migration outwards is small the Czechs are maintaining their hold on their territory strongly in comparison with the Germans.

Going eastwards, Poles and Ruthenians are found to be increasingly prolific with a correspondingly higher death rate, so that the rates of natural increase of Poles and Ruthenes are 16 and 14 respectively. Poles and Italians increase naturally at approximately the same speed. In Galicia the Poles migrate more rapidly than the Ruthenians, and their loss by migration is the highest in Austria with the single exception of the Slovenes from Gorizia. The Ruthenians migrate in large numbers from Bukovina, although some of them get no farther away than Galicia.

By comparison with the other races the Germans have the lowest birth rate and the lowest rate of natural increase as well as the smallest losses by migration.

Illiteracy

The figures in Table II with reference to illiteracy show notable differences. The percentage of illiterates among Germans, Czechs, and Tyrolese Italians is low, and there is a steady increase among the Slovenes, Poles, Serbo-Croats, and Ruthenians in order of magnitude. This table does not indicate that illiteracy is a necessary consequence of a scattered population, since the proportions in Vorarlberg and Tyrol are low and are lower in Upper Austria than Carinthia. Nor is it due to the quality of the race concerned, since there occur considerable differences both among the Germans and the Italians, while the Slovenes are much less illiterate than the other South Slavs, the Serbo-Croats. Only in the case of the Ruthenians can it, perhaps, be attributed to differences in education due to differences in religion, since the other peoples are Roman Catholic. The probable explanation divides the responsibility between economic and political causes, for the greatest industrial areas are the least illiterate, and facilities for education are distributed unevenly. A compulsory education system administered with consistent firmness could not tolerate such differences, and to western minds the fact that four adults out of five are unable to read and write seems little short of astounding.

Vital Statistics

An excess of men over women occurs in the provinces where the people are chiefly Italians or Serbo-Croats; the greatest excess of women over men is to be found among the Slovenes in Carniola.

Table III—Vital Statistics

Province	Number of women per 1,000 men	Mean percentage of total births illegitimate	Mean percentage of living births who die in first year	Mean percentage of total death due to	
				Tuberculosis	Inflammation of the lungs
Lower Austria	1,046	23	19	16	9
Upper Austria	1,017	19	22	11	6
Salzburg	995	25	20	11	8
Styria	1,006	24	19	12	7
Carinthia	998	38	19	11	8
Carniola	1,099	6	18	15	7
Trieste	1,040	18	19	19	14
Gorizia	961	4	19	14	7
Istria	912	5	19	13	8
Tyrol	991	7	20	12	9
Vorarlberg	1,012	7	16	18	7
Bohemia	1,017	12	20	15	7
Moravia	1,066	10	20	17	10
Silesia	1,046	10	21	17	9
Galicia	1,038	9	21	12	13
Bukovina	1,021	10	23	8	9
Dalmatia	1,000	4	17	12	5
Total	1,036	12	20	14	9

The figures for illegitimacy indicate striking differences among the several races. Wherever the proportion of Germans is high there the illegitimacy rate is double the average for Austria; the lowest rates occur among the Italian and Slav provinces in the south, the Polish and Ruthenian districts in the northeast being average. A high rate of infantile mortality

occurs among the prolific Ruthenians, but this rate is almost equaled among the Germans in Upper Austria; the lowest rates are found among the scanty German population of Vorarlberg and the sparse Slav population of Dalmatia. Roughly a quarter of the deaths in Austria are due to tuberculosis or inflammation of the lungs. The incidence of these diseases is greatest among the Italians of Trieste and the Czechs. The variations in the rates are related to the elevation of the provinces above sea level.

Emigration

The figures given in Table II under the head of "Migration" are compounded of two movements, emigration out of Austria and migration inwards or outwards with reference to each province. The net result of the exchange of people between Austria and Hungary is a gain for Austria, since many people from Hungary go to live in Vienna and there are movements of Germans and Slovaks out of Hungary. For many years four-fifths of the oversea emigration from Austria has been to the United States and a twelfth each to Canada and to South America (Argentina and Brazil). The total number of emigrants during the 35 years between 1876 and 1910 was 1,846,000; but there appears to be no record of the number of emigrants who returned to Austria. Approximately two-thirds of the emigrants were males, and nearly three-quarters of them were within the age limits of 15 and 40 years; nearly half of them left work on the land to emigrate. In the first ten years of this period, 1876-85, half the emigrants left Bohemia and an eighth left Moravia, so that the Czech peoples afforded the chief contribution to the emigrant stream, which was then of small dimensions. The Poles only provided 10 per cent of the total. During the period 1910-14 the total net emigration from Austria to the United States averaged 79,000 per annum; of these 36 per cent were Poles, 24 per cent Ruthenians, 10 per cent Czechs, and 7 per cent Germans.

The change in the racial character of the emigration is to some degree indicative of changed economic conditions, but it is noteworthy that throughout the period the German contribution to oversea lands has been always below the average. In addition to the constant stream of Austrians to America there are regular movements of seasonal laborers—people who spend less than a year outside Austria and then return—from Galicia into North Germany and from the German provinces into South Germany. Similar movements in the opposite direction occur in Tyrol and Carniola, where Italian or Croat laborers invade these provinces respectively for a portion of the year. During the period 1907-09 the seasonal movements numbered at least 60 per cent in excess of the oversea emigration.

Movement to the Cities

A portion of the internal migration of the people takes the form of a movement towards Vienna and the large towns. Such an urban influx,

however, does not attain the magnitude which is typical of the "rush to the towns" in Hungary. Of 38 chief towns in Austria, only six increased their population by more than 120 per cent during the period 1880-1910. These were the German towns Ostrau, Gablonz, and Brüx, the Polish towns Przemyśl and Stryj, and the Italian port of Pola. Twelve towns had an increase between 80 and 120 per cent; the German towns Vienna, Czernowitz, Innsbruck, and Aussig, the Polish towns Lemberg, Cracow, Kolomea, and Drohobycz, the Czech towns Pilsen, Smichow, Budweis, and the Italian port Trieste. Five towns failed to increase by even 40 per cent; the German towns Reichenberg, Wiener Neustadt, and Iglau, the Czech capital Prague, and the Polish town Tarnopol. The remaining fifteen towns increased between 40 and 80 per cent; of them nine are German, Graz, Brünn, Linz, Troppau, Klagenfurt, Marburg, Teplitz, Eger, and Salzburg; two are Polish, Tarnów and Stanislawów; two Italian, Trent and Gorizia; while Laibach is Slovene and Prossnitz is Czech.

Criminality

Table IV refers to one section of the criminal population of Austria, those who commit outrages upon other human beings, including the murderers. The Slovenes of Carniola show a very high proportion, especially with regard to the more serious attacks on others. Next on the list come the Slavs of Dalmatia, closely followed by the Poles and Ruthenians of Galicia and Bukovina. The more highly educated peoples—the Germans and Czechs—are least addicted to this form of criminality.

Table IV—Crimes of Violence against the Person
(Per million of the population)

Province	Serious	Light
Lower Austria	100	1,697
Upper Austria	198	2,049
Salzburg	214	2,087
Styria	470	2,761
Carinthia	238	2,849
Carniola	842	4,231
Gorizia	278	2,459
Tyrol, Vorarlberg	158	1,714
Bohemia	80	1,081
Moravia	156	1,746
Silesia	217	2,829
Galicia	263	5,731
Bukovina	338	4,040
Dalmatia	535	3,078
Total	212	2,975

Conclusions

The net result of all these considerations does not suggest that the Germanic is the most capable race in Austria. Despite the high standard of education the proportion of illegitimate births is excessive; despite the lowness of the birth rate the infantile mortality rate is equal to the average for Austria. Despite the fact that education is compulsory and that the administration is largely controlled by Germans, the government tolerates

a situation where more than half of most of the "subject races" are illiterate. It may be said in behalf of the government that religious toleration exists, but such a claim counts for little in view of the fact that most Austrians are Roman Catholics, while it must be noted that Austria is notorious for the clerical influence which bears very heavily upon the conduct of the government of the country. The Czechs are as highly educated as the Germans and inhabit areas of greater economic possibilities than they, yet the disproportion between Czech and German elements among the emigrants is indicative of unequal racial treatment.

Agriculture

Crops

More than half of the people of Austria derive their living from the land. Plate IV indicates certain geographical limitations to the distribution of the crops. The mountain area of the far west and the province of Istria produce fair quantities of only maize and wine; Gorizia, the neighbor of Istria, yields only wheat and maize. These southern areas show the influence of Mediterranean climatic conditions and agriculture in Austria. Barley is produced by the Czechs, Poles, and Ruthenians in the colder north, which is most affected by continental conditions of climate. Maize and wine are Mediterranean crops in the Slovene Alpine forelands. Potatoes are produced by the barley growers and by the Germans on their eastern borders. The Czechs alone grow extensive crops of sugar beets, and thus outdo the Austrian Germans in what has come to be considered a typical Germanic industry. It may be noted in this connection that the neighboring Slovaks in Hungary excel in the same forms of tillage as the Czechs. Moravia is the most successful farming province, then follow Bohemia, Galicia, and Bukovina, all of which are non-German. This fact follows from the consideration of Plate IV, and its importance is largely increased when it is remembered that the belt of dense population traverses this very area.

The full significance of Plate IV can only be appreciated when it is examined in close relation to Plate III. Both relatively per head of the population and proportionately in reference to the total yield of the Austrian crops the Germans are seen to be comparatively inadequate farmers; the Czechs are by far their superiors, and the more illiterate Poles and Ruthenians show themselves to be more capable cultivators.

The root crop areas are continuous with those of northwest Hungary; the total wheat crop of Austria is but a quarter of the Hungarian crop, while the Austrian crops of barley, oats, and rye exceed those of the neighboring state.

Farm Animals

Plate V shows the distribution of farm animals. Horses, cattle, and swine are reared everywhere, but sheep are confined to three elevated

regions, the Germanic mountains, the Slav Karst mountains, and the Ruthenian Carpathian hills. Upper Austria, Salzburg, and Carinthia are the chief areas for farm animals, these being almost entirely Germanic lands. The lower lands, the great producers of cereals and roots, are the least valuable for pastoral farmers, so that the Czechs are the least successful rearers of stock.

In comparison with Hungary, Austria supports on an equivalent area almost as many horses, 50 per cent more cattle, two and a half times as many sheep, and about as many swine; although neither country is a great rearer of animals, judged by English standards.

In comparison with the other peoples the German excels as a rearer of animals, and this compensates to some degree for his inferiority as a cultivator of the soil. He shows this ability in an area which extends from Upper Austria through Styria into the Germanic areas within the boundaries of Hungary. In similar fashion the Slovene in Carniola resembles the Croat in the neighboring Hungarian areas as a rearer of animals. In Plate V Styria and Carinthia appear to be less effective as producers of farm animals than Upper Austria and Salzburg, but when the greater population density indicated in Plate II is taken into consideration the disparity tends to disappear. Finally, it must be remembered that Austria contains a very high proportion of forest land, especially among the mountain areas, so that many Germans are foresters.

Summary

Austria, then, consists on the one hand of mountainous areas where the Alpine and other pastures give rise to a population of herdsmen and foresters, and on the other of upland and lowland areas whose soil yields abundant crops only in the north, where continental climatic conditions prevail. The southern peoples are largely limited by the Mediterranean conditions of climate and economic development under which they live. Physically a congeries of fragments, nationally a patchwork of races, Austria is also a combination of three types of agricultural productivity. There is neither a physical nor an agricultural link which unites the Germans with the "subject races" of the north, or with the Slavs and Italians of the south. Probably the strongest contrast within the Dual Monarchy lies between the German herdsmen and foresters and the Magyar farmers on the Alföld.

Claims of the "Subject Races" against Austria

Although the Italians in the Tyrol inhabit merely the lower end of the Austrian part of the Adige valley, their claim is extended "for strategic reasons" up to the watershed, so as to include the whole area that drains to the Plain of Lombardy. Similarly, the Italians occupy but the western strip of Istria, yet they claim parts of the South Slav lands, for economic

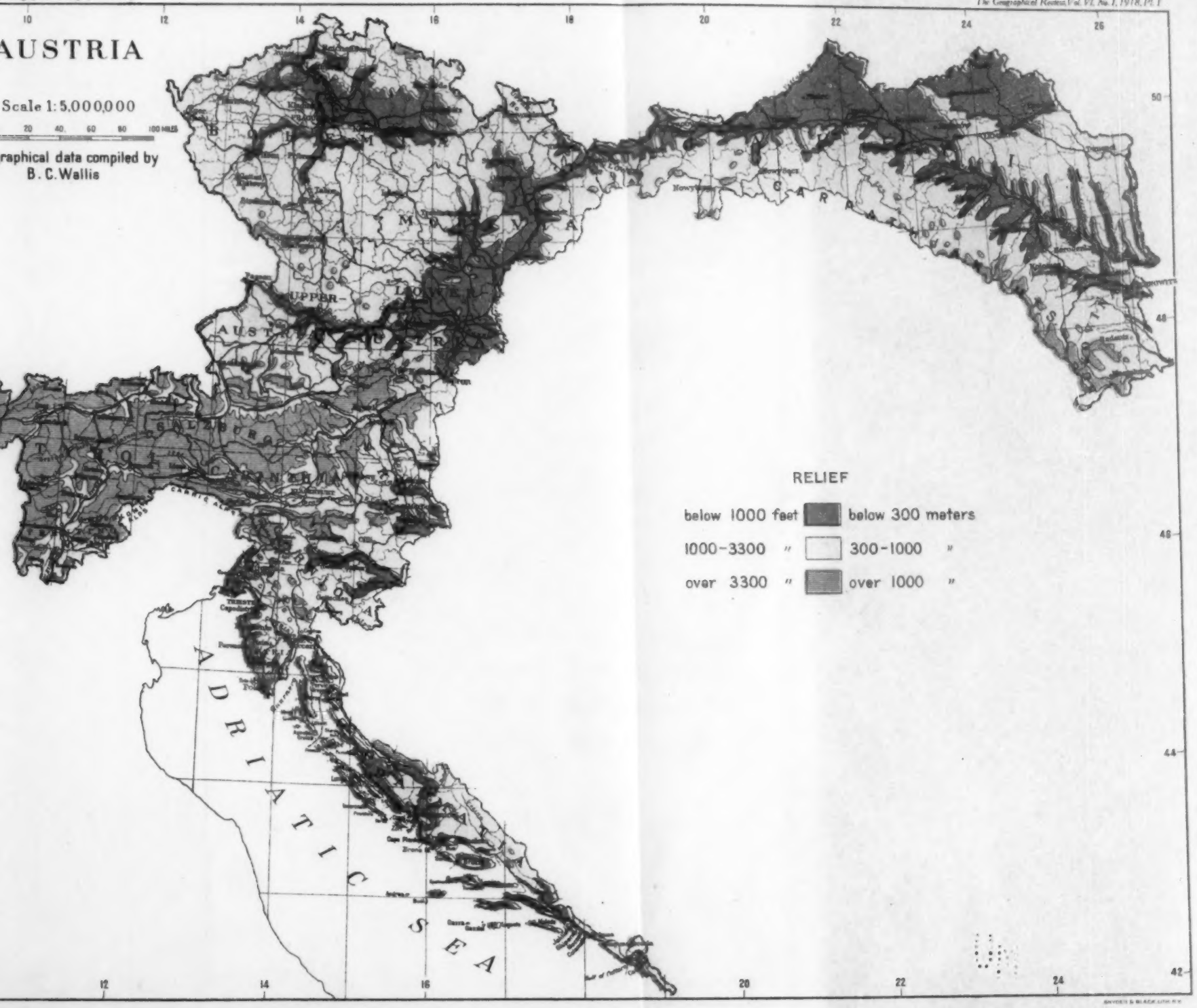
reasons connected with the ports of Trieste and Fiume, where the majority of the people form Italian islands. The South Slav movement aims at the incorporation in Greater Serbia of the Austrian lands inhabited by Slovenes and Serbo-Croats. This implies that the linguistic boundary indicated in Plate III by the 50 per cent line which stretches northwards across Istria and includes the province of Carniola should be approximately the international boundary. In the north there are four claims to Austrian lands, those of the Czechs, Poles, Ruthenians, and Rumanians. The Czech aims at the incorporation of Bohemia, Moravia, and Hungarian Slovakia as a Bohemian state. The new Poland would include the western portion of Galicia, while the successful accomplishment of "Little Russian" aims would join together part of Russia with eastern Galicia, northern Bukovina, and the inner slopes of the Carpathians in Hungary. Finally, Greater Rumania would include the southern portion of Bukovina.

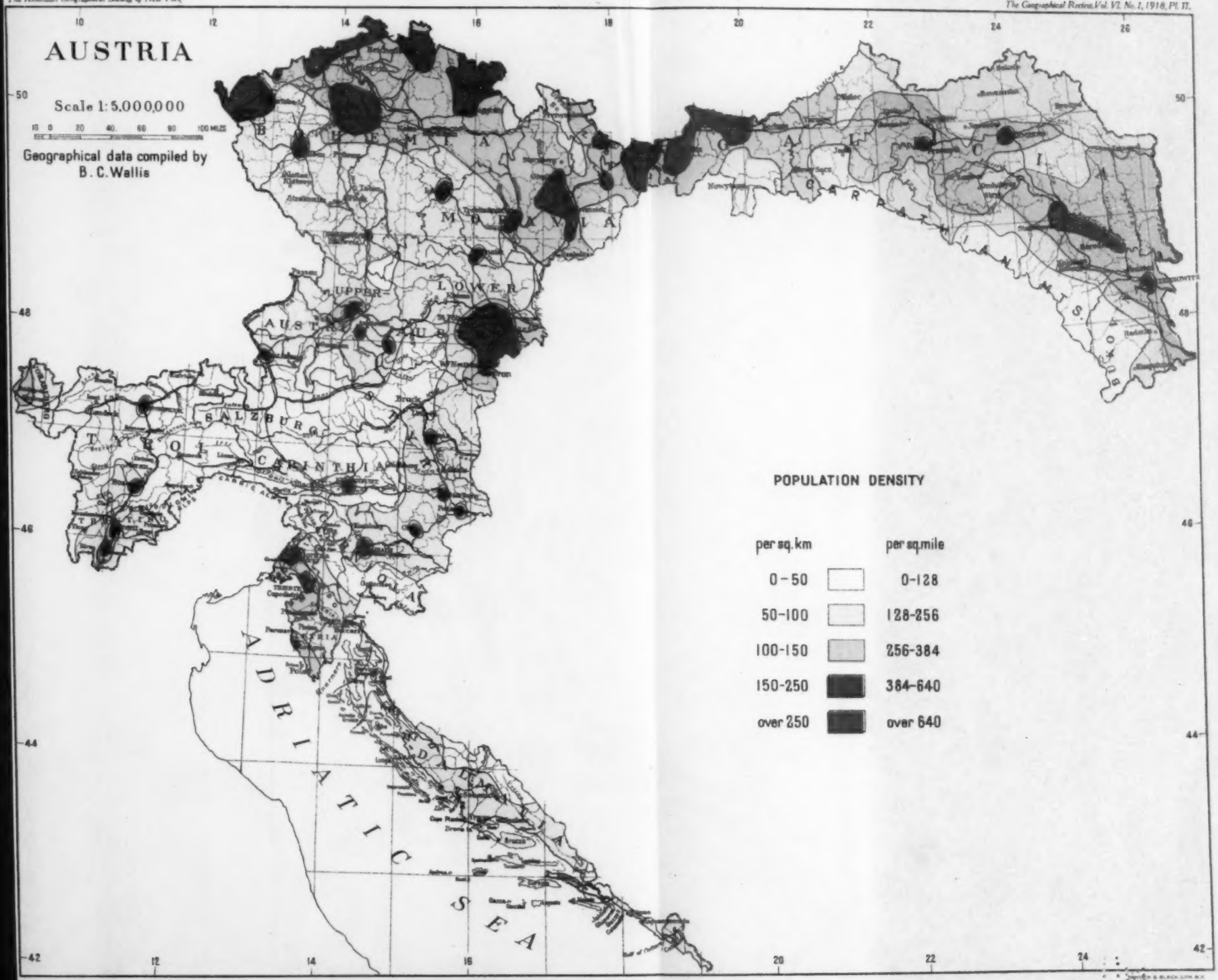
Apart from the question of the Germanic attitude towards these claims there are elements of discord both in north and south, which are due to the fact that the peoples are not separated by distinct natural features. The linguistic boundary between Italian and Slav in the south cuts across the peninsula of Istria and leaves the two great ports—Trieste and Fiume—as Italian islands fringing a Slav sea. In the north the linguistic boundary between Pole and Ruthenian is somewhat hard to define, since there are many Poles in eastern Galicia, and the difficulty is increased by the fact that the lowland and the belt of dense population would cross the linguistic boundary at a place which would not be marked by any physical feature of importance such as marks the Austro-German boundary, which is of the same type nationally and is defined at present by the Elbe Gate.

The Final Settlement

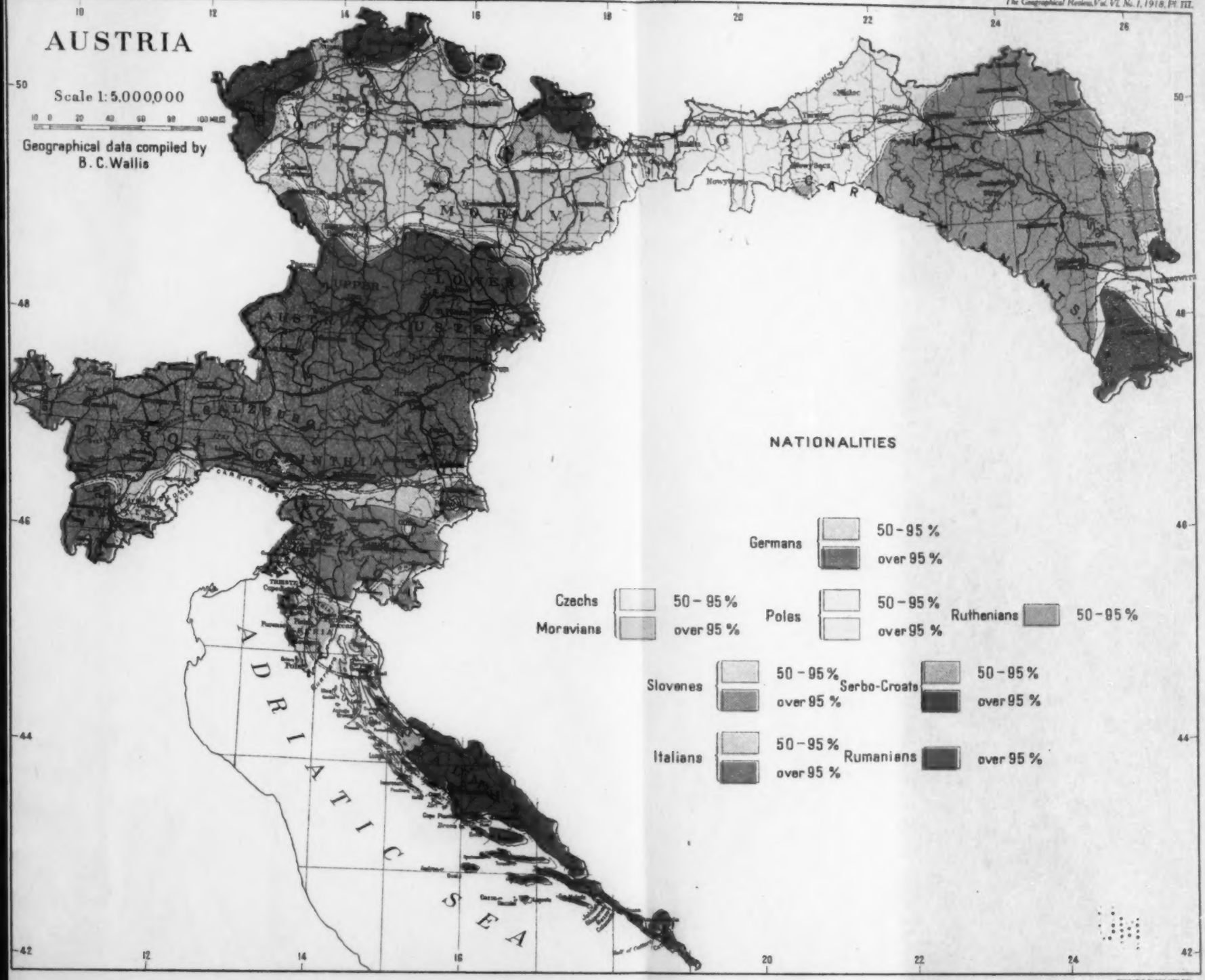
There can be little doubt that if the "nationalities" receive fair treatment in the final settlement new political boundaries will be erected somewhere in the neighborhood of the 50 per cent lines shown in Plate III. It would follow from this that the Germans in Austria would be limited to the mountains and the Danube passage. They would be barred politically in their outlook eastwards and in their outlook towards the Mediterranean; they would be separated politically from Prussia by the Czechs and would be compelled to re-orient their outlook and to approximate in character to one of the existing states of South Germany. Should strategic or other considerations necessitate the foundation of a Slav march, as mentioned in the earlier article,[3] the Germans would be separated from the Magyars; otherwise the boundary between German and Magyar would stretch from the Danube near Pozsony to the Mur. In any event, since the Danube is not very important as a waterway above Vienna, the Germanic hold upon the great river of Central Europe would be seriously curtailed. Economi-

[3] Cited in footnote 1, reference on pp. 479-480.


AUSTRIA
Scale 1:5,000,000
20 40 60 80 100 MILES
raphical data compiled by
B. C. Wallis
RELIEF
below 1000 feet
below 300 meters
1000-3300 "
300-1000 "
over 3300 "
over 1000 "
ADRIATIC SEA
10
12
14
16
18
20
22
24
26
50
48
46
44
42


AUSTRIA
Scale 1:5,000,000
10 0 20 40 60 80 100 MILES
Geographical data compiled by
B. C. Wallis
BOHEMIA
MORAVIA
GALICIA
CARPATHIAN MTS.
BUKOWINA
UPPER AUSTRIA
LOWER AUSTRIA
SALZBURG
TYROL
CARINTHIA
ADRIATIC SEA
POPULATION DENSITY
per sq. km
per sq. mile
0 - 50
0-128
50-100
128-256
100-150
256-384
150-250
384-640
over 250
over 640

The Geographical Review, Vol. VI, No. 1, 1918, Pl. III.



AUSTRIA
Scale 1:5,000,000
0 20 40 60 80 100 miles
Geographical data compiled by B. C. Wallis.
BOHEMIA
A 4, B 1, 2, 3, 6, 7
MORAVIA
A 1, 2, 3, 4, 6, 7
SILESIA
A 8, B 2, C 3
GALICIA
A 1, 6, B 2, 4, C 3
A 5, B 1, 4, 6
C 2, 3
BUKOVINA
LOWER AUSTRIA
B 2
C 1, 4, 6
UPPER AUSTRIA
A 1, 2, 4
C 3
VORARLBERG
SALZBURG
B 1, 2, C 4
STYRIA
B 1, 5
C 2, 4, 8
TYROL
B 8, C 5.
CARINTHIA
B 1, 2, 4, C 5
CARNIOLA
B 1
C 5, 6, 8
GORIZIA
A 8, C 1
ISTRIA
A 8, C 5
DALMATIA
A 8, C 1.
ADRIATIC SEA
CROPS
Production per 1000 Inhabitants
1 Wheat
2 Rye
3 Barley
4 Oats
5 Maize
Hundred quintals
A over 6 over 12 over 12 over 9 over 6
B 4 – 6 8 – 12 8 – 12 6 – 9 4 – 6
C 2 – 4 4 – 8 4 – 8 3 – 6 2 – 4
6 Potatoes
7 Sugar Beets
8 Wine
Hundred quintals
100 hectolitres
A over 60 over 60 over 12
B 40 – 60 40 – 60 8 – 12
C 20 – 40 20 – 40 4 – 8

AUSTRIA
Scale 1:5,000,000
Geographical data compiled by B. C. Wallis.
BOHEMIA
C 1, 2, 3
MORAVIA
C 1, 2, 3
SILESIA
GALICIA
A 2, B 1, C 3
UPPER AUSTRIA
A 1, 3
B 2
LOWER AUSTRIA
C 2, 3
B 1, 2, 3
C 4
BUKOVINA
VORARLBERG
B 1
C 3
B 1
C 2, 3, 4
SALZBURG
STYRIA
A 3, B 1
C 2
TYROL
B 1, C 3, 4
CARINTHIA
A 3, B 1, 2, C 4
C 2
1, 3
GORIZIA
CARNIOLA
B 1, 2, 3
ISTRIA
C 3
B 4
ADRIATIC SEA
DALMATIA
A 4, C 2, 3
FARM ANIMALS
Distribution per 1000 Inhabitants
1 Cattle
2 Horses
3 Pigs
4 Sheep
A over 600 over 90 over 400 over 750
B 400-600 60 - 90 250 - 400 450 - 750
C 200-400 30 - 60 100 - 250 150 - 450

cally, the Austrian Germans would be stripped of many elements of national prosperity. The main farm lands are not German; the main mineral resources of Austria are outside the German territories; the chief industrial area of Austria lies within the lands of the Czech. Their future prospects would lie towards development upon Swiss lines, with the typical Swiss limitations of high mountains and no coast line.

Could Vienna decline to the level of Bern? Situated at one of the most definite nodal points in the world, the crossing place of the great east-and-west route through the heart of the European peninsula with the great north-and-south isthmian route from the cold Baltic to the sunny Mediterranean, could the loss of political influence be replaced by other influences which would restrain the inevitable decay? Or must Vienna, a second great city of Roman Catholicism, follow the fortunes of Rome?

DUTCH CARTOGRAPHERS OF THE SEVENTEENTH CENTURY

By W. REDMOND CROSS

Through the long turmoil of the sixteenth century in Europe, while liberty battled grimly against the Spanish plan for world dominion, one thought recurred persistently to the minds of all classes. To be sure, the form of the thought varied with the thinker, for each class thought of the thing which it desired. The king saw a new empire, the peasant dreamed of a home free from wars and feudal taxes, the merchant planned a lucrative trade in valuable commodities, the priest had visions of millions of unbelievers brought into the fold, and the adventurer had before him a field brimming with excitement and containing possibilities of boundless reward. Hopes differed, but all had the same source. In palace and cottage, in banking house and cloister, one subject of discussion never failed—the New World.

This widespread interest naturally led to a demand for maps to aid in the visualization of the newly found lands, and the result was a development in the science of cartography that was remarkable. The artistic possibilities were also appreciated, and a great deal of progress was made in the decoration both of the map proper and of the surrounding border. For the first the usual method was to introduce ships and marine monsters at sea and to people the land with beasts and savages. More elaborate work was done on the borders, particularly in the *mappemondes*, and they frequently contain compositions of great beauty. The cartouches upon which appeared the name of the map and its maker were usually highly decorated. The improvement for the century reached its high point in the genius of Mercator and the industry of Ortelius, who were the first cartographers to give a tolerably correct picture of the outlines of America and who should be recognized as the foundation stones of the school which is the subject of this article.[1]

Dutch Supremacy on the Ocean

The successful defence of the United Provinces against the mighty power of Spain was followed by a period of extraordinary prosperity. Dutch

[1] On this general topic see:

Justin Winsor: The General Atlases and Charts of the Sixteenth and Seventeenth Centuries, in "Narrative and Critical History of America," edited by Justin Winsor (8 vols., Boston and New York, 1884-89), Vol. 4, pp. 369-377.

P. L. Phillips: A List of Geographical Atlases in the Library of Congress, with bibliographical notes, 3 vols., Library of Congress, Washington, D. C., 1909 and 1914.

Woodbury Lowery: A Descriptive List of Maps of the Spanish Possessions Within the Present Limits of the United States, 1502-1820, edited, with notes, by P. L. Phillips, Library of Congress, Washington, D. C., 1912.

captains penetrated into the remotest corners of the seven seas, and Dutch merchants captured the carrying trade of the world. For almost a century they reigned supreme in oceanic traffic, and it took three naval wars to prove that the English were their masters in this field. As late as 1667 Admiral de Ruyter sailed up the Thames and burned the English fleet at Chatham, and it was not until after the governments of the two countries were joined by William III in 1688 that the English definitely took first place in high-seas commerce.

The arrival at Amsterdam, Rotterdam, or Dordrecht of a merchantman from the other side of the world was a matter of almost daily occurrence, and it is pleasant to picture the welcome given to the home-coming captain with the solid burghers sitting about him and listening to his tales of discoveries and wondrous adventures in unknown lands.

The Business of Cartography

The demand for maps created by such conditions made the business of cartography a profitable one, and the commercial ability of the Dutch showed itself in the keenest kind of competition between the different publishing houses. They vied with each other in the issuance of sumptuous volumes, which, from the standpoint of beauty, far excel the atlases to which we are accustomed today. To understand the conditions under which almost all of the maps of this time were produced it must be borne in mind that they were issued by publishing houses, for the most part large establishments, each of which had its staff of draftsmen and engravers, so that it is impossible to tell how much work, if any, was done on a given map by the man to whom it is attributed. Jodocus Hondius and W. J. Blaeu, for instance, probably did most of the work on the maps issued by them; but their successors became, more and more, merely publishers who decided when to issue a new atlas, whether the circumstances justified the cost of preparing a new plate, and similar questions of business policy. The growth of the business aspect at the expense of the professional point of view is also indicated by the contents of the atlases, which in the second half of the century sometimes include a preponderance of plates procured from other sources than the workshop of the issuing house.

The House of Hondius[2]

The first great name of the period was Jodocus Hondius (1563-1611), who not only succeeded to the business of his brother-in-law Rumoldus Mercator and thereby came into possession of the plates of the famous Gerardus Mercator, but was himself an excellent workman. His maps are a delight to the eye and in some respects exhibit an accuracy which is lacking in the product of his later rivals. He founded the series of Hondius-

[2] See L. A. J. Quetelet: Histoire des sciences mathématiques et physiques chez les Belges. Brussels, 1854, p. 116 ff.

Mercator atlases, beginning with the second edition of the great Mercator, and gradually added his own plates, dropping his father-in-law's as they became antiquated. This monumental work was carried on by his son Henricus Hondius and son-in-law Joannes Jansonnius and was issued in more than two dozen editions in many languages.

The younger Hondius (died 1638) was diligent in his chosen profession and was responsible for many good plates, but he cannot be classed with his father as a cartographer and had less influence on the movement than his brother-in-law Jansonnius (died 1666), who produced many magnificent volumes under his own name, in addition to the work which he did on the Hondius-Mercator series.

Repeated Use of the Same Plates

Excellent as was the work of the engravers in the decorations with which they embellished their maps, it is interesting to note that the thrifty Dutchman did not often indulge in the expense of copper and engraving merely in order to illustrate the latest reported discoveries. A plate once made was used again and again, and prints were taken from it long after it was recognized as cartographically inaccurate. Minor changes were often made on plates, resulting in different "states" which form a study in themselves. This conservatism of the makers of maps caused the perpetuation of many mistakes, of which the Island of California is a famous example. Founded on a supposed voyage from the Straits of Anian to the Gulf of California, the error appears on most of the maps of the last three-quarters of the seventeenth century and also in the eighteenth century long after its falsity had been demonstrated through the passage by land from New Mexico to California by the Jesuit Kino in 1698-1701.

Engravers' Names

The names of many engravers have come down to us because they were apt to try to attain immortality by cutting their names in some corner of the plate. The nomenclature of the maps is full of pitfalls, as the purchaser of a plate often replaced the name of the maker by his own and then issued the map without other change. Latinization of names was usual, as it was with authors of the period, and the simplest method seems to be to refer to the publishers by the names which they were accustomed to sign on the maps. This rule is not, however, always easy to follow, as for example in the case of the Visscher family. Nicolaas Visscher (1618-1679), apparently fearing that the public would not buy his product without the authority of a well-known name, usually added a middle initial and signed his maps Nicolaas (or N.) J. (or I.) Visscher (or Piscator). This was the name of his father (died 1637), who increased the confusion by often signing himself C. (for Claes) J. Visscher (or Piscator). In the third generation Nicolaas Visscher (1649-1709) was not so modest and signed his

own name; but, as practically none of the maps are dated, it is sometimes difficult to know which member of the family to credit with a given plate. Some of the best work of the century was turned out by this house, which, founded in 1615, was handed down from father to son until 1717, when the plates became the property of Pieter Schenk.

Coloring

The coloring of the maps was done by hand in water colors and the color scheme and technique, particularly in the case of prints from the more elaborately decorated plates, was difficult enough to justify the classing of this department as an art in itself. The larger establishments had their own colorists; but there were many outsiders who earned their living by coloring maps, and the profession was a well-recognized one throughout Europe. The quality of workmanship in the coloring of maps varies greatly and constitutes a not unimportant criterion in the eyes of the modern collector.

The House of Blaeu[3]

Encouraged by the prosperity resulting from the Twelve Years' Truce with Spain, W. J. Blaeu (1571-1638) founded in 1612 the famous publishing house which, controlled after his death by his sons and grandsons, had a larger output than any other establishment in the seventeenth century. The first atlas was not published until 1631, but the elder Blaeu was tireless in his efforts and produced a large number of splendid plates which were used by his son Joannes (1596-1673) in the atlases published by him. The product of the house of Blaeu was unexcelled for beauty and workmanship, and while, as was customary, the plates were used long after they had become antiquated, they fairly represented the extent of geographical knowledge attained at the time of their engraving.

Frederick de Wit

In 1672 the Grand Pensionary John de Witt was torn limb from limb by an infuriated mob at The Hague, and by a strange coincidence this year marks the rise to prominence of his namesake Frederick de Wit, the cartographer, through his purchase of the plates which escaped destruction in the fire that ended the career of the house of Blaeu. Some of the most beautiful plates of the century came from the hands of de Wit, notably a wonderful *mappemonde* which was afterwards used by Carolus Allard.

The elder de Wit had begun as an engraver of maps in 1648; and the firm, which lasted until 1712, produced 380 land maps and 30 sea charts, all of a high standard of workmanship.

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[3] See P. H. J. Baudet: Leven en werken van Willem Jansz. Blaeu, Utrecht, 1871.
E. L. Stevenson: William Janszoon Blaeu, 1571-1638: A Sketch of His Life and Work, with an especial reference to his large world map of 1605, *Hispanic Soc. of Amer. Publ. 55*, New York, 1914, with facsimile of world map of 1605 in 18 sheets and key plate.

Significance of the Period

The period is interesting because it represents the high-water mark of decoration as applied to maps, and the influence of the movement lasted well into the eighteenth century, although a gradual deterioration, both in drawing and coloring, is easy to trace. With increasing accuracy went a loss of beauty, until the present period in cartography was reached. It is interesting to note that the use of symbols is increasing, particularly in the most recent maps, such as those for aviators, reminding us of the pictures of beasts by which the old cartographers used to illustrate the fauna of the different countries. There is at present a constant increase in the use of color as an aid to the visualization of the wide range of geographical phenomena, and it is to be hoped that the makers of maps will learn to select their shades with an eye to the decorative value of the completed whole instead of seeking only contrast. We have here the possibility of a product combining accuracy, symbolism, and color in a way never dreamed of by the Dutch of the seventeenth century.

GEOGRAPHICAL RECORD

AMERICAN GEOGRAPHICAL SOCIETY

Extension of the Royal Geographical Society's Hospitality to Fellows of the American Geographical Society in London. In a communication recently received from its secretary, Mr. Arthur R. Hinks, the Council of the Royal Geographical Society make known that the society has officially extended the hospitality of its house and an invitation to its meetings to any Fellows of the American Geographical Society who may be temporarily resident in London on war duty. It is hoped that as many Fellows as possible will avail themselves of the facilities so generously placed at their disposal.

NORTH AMERICA

Phototopographic and Aërial Surveying in the United States. Photographic methods have been employed in various forms for many years by surveyors in foreign countries, but the use of the camera in surveys in the United States was, until the commencement by the U. S. Geological Survey of the work in Alaska, confined to a very few special applications. Due to the enormous size and relatively small relief of a large part of our western country, the plane table has reached a high state of development in the United States. In a recent work by J. W. Bagley (The Use of the Panoramic Camera in Topographic Surveying, With Notes on the Application of Photogrammetry to Aërial Surveys, *U. S. Geol. Survey Bull. 657*) possibly the first authoritative account is given of the use of photographic surveying in the United States. (For an article on its use in Canada, by M. P. Bridgland, with general references on phototopography, see the *Review* for July, 1916.) Major Bagley himself has devised some new instruments and methods and has proved conclusively that the panoramic camera is extremely valuable in certain kinds of topographic work. It is shown that the field cost of surveys made by the use of panoramic camera and plane table is far lower than that of surveys made by the plane table alone, and, though the compilation of the field data in the office is more laborious, the final cost of the completed map is nevertheless lower.

Of special interest at this time is a chapter on "The Application of Photogrammetry to Aërial Surveys," based largely on French treatises. Since the publication of this work, the War Department has afforded Major Bagley opportunity to try out his theories in practice. As a result a tri-lens camera and a special transformer have been developed, and Major Bagley is now engaged in training and putting into the field military aërial survey parties for the preparation of aëronautical maps. The appearance of a supplementary publication describing his further researches will be eagerly awaited.

JAMES GORDON STEESE

Tornadoes as Climatic Phenomena of the United States. No discussion of the climates of the United States is complete without reference to tornadoes. These have their fullest development over the great central lowlands of the country. They are peculiarly and characteristically American. Nowhere else in the world do they find equal opportunity. Nowhere else are they as frequent, as violent, as destructive, as here. It is from the larger climatic point of view that American tornadoes are considered in a recent paper by Professor R. DeC. Ward of Harvard University ("The Tornadoes of the United States as Climatic Phenomena," *Quart. Journ. Royal Meteorol. Soc.*, Vol. 43, 1917, pp. 317-320). The purely meteorological aspects of the tornado are given slight emphasis. But, as what a tornado *does* is determined by what it *is*, the nature of these phenomena is necessarily considered. The subjects taken up are damage and loss of life in tornadoes; distribution of tornadoes in place and time; tornado weather types; protection of life and protection of property, including tornado insurance. Three of Finley's charts of tornado damage are reproduced. There are four photographs of damage caused by the St. Louis tornado of May 27, 1896; and a new composite weather map, showing conditions favorable for tornadoes, is given. A bibliography is included.

The Different Meanings of the Terms "Leeward Islands" and "Windward Islands." Much confusion exists as to the meaning of the terms "Leeward Islands" and "Windward Islands." Now that the interests of the United States in the Caribbean

are becoming greater, the question assumes more direct importance for Americans. Practical need for a definition has been presented recently by the extension of the United States meteorological service in the West Indies. After consulting the Geographic Board, the Weather Bureau has adopted the following designation to be used in its reports: The term "Leeward" is to embrace the islands between the Anegada Channel and the island of Dominica, including the latter; the remainder of the chain, including Barbados, but excluding Trinidad and Tobago, is to be styled "Windward" (*Monthly Weather Rev.*, Sept., 1917, pp. 455-456).

It is to be feared that this grouping will not eliminate confusion, though it can scarcely add to that already existing in the usage of the terms. The U. S. Hydrographic Office, the British Admiralty in its "West Indies Pilot," and the Spanish Naval Department in the official "Derrotero" (Pilot), each employs a different grouping of the islands under these names. Furthermore standard geographical handbooks and reliable maps rarely agree in the application of the terms. It is small wonder, since the problem offers a combination of historical, geographical, nautical, and political elements.

The names Leeward and Windward were purely nautical in their original application. The Spaniards were the first to employ them. The use of the terms "Islas de barlovento" (Windward Islands) and "Islas de sotavento" (Leeward Islands) depended upon the position of the navigator, the gateway by which he entered the archipelago, and the season in which he made his voyage. The names do not seem to have been applied in the West Indies until the end of the sixteenth century, and probably their use was not general until many years later. Early maps, such as Mercator's of 1538, that of Orontius Finaeus, 1566, the two of Peter Martyr, 1534 and 1587, and that of Ortelius, 1571(?), do not employ the terms at all. Neither does Alonso de Santa Cruz in his "Islario General," 1560, though he gives a detailed account of the West Indies. The "ruttiers" in use among English navigators at the end of the sixteenth century make no mention of such grouping of the islands even when they list them individually, with great care giving distance and geographical location of the different ones. Juan López de Velasco, however, in his "Geografía y Descripción Universal de las Indias" (1574) speaks of Dominica as being one of the "Islas de barlovento."

The terms as used by the Spaniards were deeply significant in the days of sailing craft. Remembering the course taken by Spanish vessels going to America one can appreciate the application of the names. The trade wind path which Columbus had discovered in his second voyage was generally followed by other explorers and later by merchant ships. Early English, Dutch, and French navigators often reached America by much the same route. The Spanish traders, however, stuck closest to the course marked out by Columbus, due largely to the fact that, for safety from enemy corsairs and to comply with the government regulation of trade with America, their vessels were permitted to leave Spain but twice a year and must sail in fleets under naval escort. From 1561, when this system of convoyed fleets was established by law, until 1748, the year in which the plan was finally abandoned, Spanish commerce followed this path to the West Indies. Sailing from Spain in spring or summer, when the trade winds were constant but carried them far to the southward, they touched at the Canaries and from there steered for the easternmost islands of the Caribbean. The usual landfall was the little island significantly called "Deseada" (longed for). At Dominica or Guadeloupe, where there was wood, water, and good anchorage, a stop was made and the fleets were divided into two groups. One part went, still under escort, along the coast of the Spanish Main to Cartagena and Porto Bello on the Isthmus of Panama. The other, keeping within sight of the Greater Antilles, steered for Vera Cruz. When cargoes were discharged the ships all gathered in the harbor of Havana, where, as an old English writer quaintly says, "the royal fleet of Spain doth ryde until winde and season do combine to wafte them homeward." At times vessels bound for Panama sailed from Spain as a separate fleet and entered the Caribbean near the island of Tobago, from there skirting the coast to the isthmus.

To sailors who followed these routes there were two groups of islands which came to bear the name Sotavento. These were the northern members of the Caribbees (possibly including the Greater Antilles; see "Historical Geography of the British Colonies" by Sir Chas. P. Lucas, Vol. 2, The West Indies, p. 33) and the islands along the coast of Venezuela, the westward extremes of the arc described by the entire chain of small islands. Herman Moll's map of 1710 is typical of the many that reflect this usage of the terms. The name Barlovento was applied to the chain of islands lying farthest to the east and apparently included all from Guadeloupe or Dominica to Trinidad. Rochefort in his "Histoire Naturelle des Iles Antilles de l'Amérique" (Paris, 1667, p. 118) makes St. Christopher the dividing point and lists the islands northwestward from there (St. Eustatius, St. Bartholomew, Saba, Anguilla, Sombrero, Anegada, the Virgin Islands, and St. Croix) as the "Iles de dessous le Vent."

In later usage there has been great diversity. The settlement of the islands by the English, Dutch, and French during the first half of the seventeenth century lessened the significance of the names as mere nautical terms, gave importance to the climatic effect of the more northerly winter trade winds, and also introduced a political element by the division of the islands among several powers. The English possessions in the Caribbees were formed into two administrative units as early as 1671, with the French colony of Guadeloupe as the dividing line between Leeward and Windward. But this political grouping has varied from time to time. The present designation "British Leeward Islands" is used to include Montserrat, Dominica, Antigua, St. Kitts (St. Christopher), and Nevis, to which are attached the smaller units of Barbuda and Redonda, Anguilla, and the British Virgin Islands. The "British Windward Islands" colony consists of St. Lucia, St. Vincent, the Grenadines, and Grenada. Preponderating English influence in the West Indies in the last two centuries has caused this political division largely to supersede the nautical and geographical grouping. The development of steam navigation in the nineteenth century finally robbed the original nautical terms of all their meaning. As a consequence the islands along the Venezuelan coast have been left without a group name, while the French and Dutch possessions and the former Danish West Indies are often understood to be excluded from the groups of which they form an integral part geographically.

In any attempt to harmonize the grouping of these islands the political factor should certainly be made secondary. A proper adjective may be prefixed to indicate the nationality of individual islands or small groups.

If weight be given to the history of the terms the correct application would be that in most common use among the Spanish navigators, and we should have the two groups of Leeward Islands, with Windward including those from Guadeloupe (or Dominica) to Grenada. If on the other hand we apply the terms with a purely geographical significance we should call only the Dutch-Venezuela group the Leeward Islands and make the term Windward include all from Grenada (or even Tobago) to Porto Rico (perhaps including the latter), since, with very insignificant exceptions, each unit of this Caribbee chain has a windward position during a considerable part of the year, the southern section being most directly exposed to the trades from May to November and the northern group during the remaining months.

"Northers" of the Panama Canal Region. The "northers" of the Gulf of Mexico, western Cuba, and the coasts of Mexico and Central America, have long been known. They are attracting more attention lately because of the increasing use of the Panama Canal. In a recent number of the *Monthly Weather Review* (Nov., 1917, pp. 546-549) there are some notes, historical and meteorological, on the "northers" of the Canal Zone. "Northers" are strong northwest to northeast winds, which blow at times from November to April. They last from one to as many as eight days and often cause damage to shipping, dock structures, etc. They result from the presence of a marked high pressure area to the northward, with steep gradients, and are essentially southward extensions of the "cold waves" of the United States. Four weather maps, illustrating typical conditions for the production of "northers" in the Canal Zone, are given.

R. DeC. WARD

EUROPE

Illustrations of Seasonal Migration from Switzerland and the Dinaric Countries. The pastoral nomad is a familiar figure in geographical literature; much less so the *transhumant*, though his life is particularly interesting from a geographical point of view. The transhumant is distinguished by the periodicity of his migrations and his possession of a fixed home. His economy is related to mountainous relief, and its chief determinant is climate. The conditions under which transhumance obtains notable proportions are defined by De Martonne as the proximity of high mountains habitable for five months of the year and plains semi-steppe in character subjected to summer drought. Such conditions may be found in the mountain borders of the Mediterranean. De Martonne himself made a special study of transhumance in the southern Carpathians (La vie pastorale et la transhumance dans les Karpates méridionales, "Zu Friedrich Ratzels Gedächtnis," [Ratzel memorial volume], Leipzig, 1904), where the movement is persistent and long established. The Spanish meseta affords typical areas of transhumance though the recent improvement of economic conditions has greatly lessened its sway (see André Fribourg: La transhumance en Espagne, *Ann. de Géogr.*, Vol. 19, 1910, with 2 maps; article abstracted by O. Quelle and maps combined into one in *Petermanns Mitt.*, Vol. 56, II, 1910). The term transhumance indeed is of Spanish origin (*trashumar*, from *trans* and *humus*). Transhumance is known from the Iberian to the Anatolian peninsula and into Armenia and Persia, though in the two last regions, where it is practiced by Kurds

and Tatars, it approximates to true nomadism. The Atlas region again is admirably adapted for transhumance, and here should be remarked the recent change from nomadism to this higher form of pastoral migration as the country has become peaceable under French rule. The way in which economic, social, and other strictly non-geographic factors enter into the control of transhumance is exceedingly interesting, but it is the geographic factors that are of first importance.

An illustration of transhumance in a region where it is combined with highly developed agricultural exploitation is given in a recent paper by Stanislas Lencewicz (La transhumance dans le val de Réchy, *Bull. Soc. Neuchateloise de Géogr.*, Vol. 25, 1916, pp. 106-121). The narrow, deep valley of Réchy, a left tributary of the Rhone in the canton of Valais between the Val d'Hérens and the Val d'Anniviers, has a long winter and is not inhabited permanently. The villages at the mouth enjoy only a scant precipitation (18 inches per year), and the inhabitants have recourse to the waters of the Rhone for irrigation. During the summer they use the pasturage on the glacially moulded valley shoulders and glacial cirques. These pasturages and their chalets are communal property; the business of the summer herding is also a matter of communal organization. The migration begins in May and by successive stages reaches the upper pastures, about 8,000 feet in elevation, at the beginning of July, to be completed during the second half of September. The herds are almost exclusively of cows, the making of cheese and butter being the primary object of the migrations. These products are divided among the individual owners according to the number and value of their herds.

On the westward slopes of the Dinaric Alps summer drought is intensified by the extreme development of karst phenomena. Transhumance is very widely distributed. Various forms of the migrations are described by Jevto Dedijer in the *Annales de Géographie* for September 15, 1916 (La transhumance dans les pays dinariques, Vol. 25, pp. 347-365). Towards the beginning of June, when the lower slopes of the Adriatic flanks of the Dinaric Alps, sunbaked and waterless, begin to be insupportable, the flocks of sheep are taken up to the summer pastures on the high mountains of Bosnia, Herzegovina, and Montenegro, three to six days' journey from the permanent villages. On the way the flocks and their herders, who are supplied by the private pastoral organizations, pass through an intermediate zone where live pastoralists who are not under the necessity of migrating in the summer. In the mountains a stay of about three months is made, until the first abundant rains of autumn, when return is made to the village. Of this simple form there are many modifications, dependent on morphological, hydrographic, and climatological variations in the area. Again, more complex causes account for such extremes as are represented by an "atavistic," or ancient surviving type, where a group is entirely pastoral and where all its members follow the annual migrations, to "decadent" forms obtaining in the fertile basins or *polyes*, where now are very few flocks. In some of the latter cases amelioration of the agrarian situation by the Ottoman government in the period 1850-60 led to increased agriculture and a more sedentary life.

On the eastern slopes of the Dinaric Alps, where approach to Central European types of climate and vegetation exists, transhumance takes on an entirely different form. Migrations are made at different seasons and are made down to the plains, instead of up to the mountains. On this side are heavier winter snows; the beasts are stabled during the winter—whence fodder becomes a problem. In autumn, after the summer harvests are gained, the flocks are taken to the plains, to return with the first fall of snow. They set out again at the end of February, are pastured in the plum orchards, and return about the end of April.

AFRICA

An African Scourge: The Tsetse Fly. Thirty-four years ago Europe definitely assumed the responsibility of the African problem. Today the issue of that problem is acute, and great is the need for an appreciation of the factors contributing to its peculiar difficulties. Not the least of these is the character of tropical Africa as a storehouse of deadly germ diseases. Notoriety in particular attaches to those diseases transmitted to man and beast by the tsetse fly. In this rôle and in virtue of its wide distribution the tsetse becomes one of the most serious barriers to progress. As early as 1851 Livingstone recognized the tsetse as "the scourge of Central Africa" (letter in *Bull. Amer. Geogr. Soc.*, Vol. 1, 1852-54, pp. 47-60). The characterization is as true today. "It [the tsetse] offers European civilization what is perhaps the most considerable obstacle against it," writes Roubaud in 1913 (E. Roubaud: Les mouches tsétsés en Afrique Occidentale Française, *Ann. de Géogr.*, Vol. 22, 1913). "The presence of the tsetse fly constitutes one of the greatest of the obstacles to our development of vast areas," says Fox of Northern Rhodesia (*Geogr. Journ.*, Vol. 48, 1916). Many specific instances might be quoted to confirm these statements. Perhaps the most striking is the case of the late ravages of

sleeping sickness in Uganda. The disease entered the country from the Congo in 1901-02. At the end of 1903 the deaths from it numbered 90,000. Whole villages were wiped out and great tracts of fertile land, such as the Busoga shores of Victoria Nyanza, were desolated (geographical summary of the "Report on the Measures Adopted for the Suppression of Sleeping Sickness in Uganda" by Sir Hesketh Bell, *Colonial Repts. Misc. Cd. 4990*, 1909, in *Scottish Geogr. Mag.*, Vol. 26, 1910). Vast areas in Angola and the Congo where the disease is truly endemic have likewise been depopulated. "The difficulty in obtaining food from the natives is hardly credible to those who regard the Congo banks as populous and fertile; if they were more populous they could easily be made productive" (George Grenfell: The Upper Congo as a Waterway, *Geogr. Journ.*, Vol. 20, 1902). The maps of the Sleeping Sickness Bureau, London, 1909 (reproduced in *Petermanns Mitt.*, Vol. 56, II, 1910, Pl. 11), show the prevalence of the disease along the Congo mainstream and the Ubangi and suggest a reason for the lack of population. Density of population bears an important relation to future development in Central Africa. Already difficulty has been experienced in obtaining labor for the Katanga copper mines. Along the Lufira and other tributaries of the Lualaba draining the Katanga plateau sleeping sickness has carried off large percentages of the population (see maps accompanying the report by F. O. Stohr: La maladie du sommeil au Katanga, London, 1912). The ban on cattle-raising in tsetse fly zones is an incalculable loss not only locally to natives and white pioneers but in wider questions of transportation. Before the tsetse-haunted belt of equatorial forest the caravans of Islam were halted; Islamic influence, so dominant in North Africa, does not pass beyond the Sudan. In the late campaign against German East Africa the Rhodesian front suffered disability under the lack of animal transport. The corollary to this restriction is an expensive demand on human porterage in regions where labor is not superabundant.

Geographically the greatest interest in the tsetse problem lies in the distribution of the fly and the physical factors controlling that distribution. The two most important species of tsetse (*Glossina*) are *palpalis* and *morsitans*. The former is especially associated with sleeping sickness, the latter with the cattle sickness, locally known as *nagana*, though it has lately been proved that *morsitans* can also act as transmitter of a form of sleeping sickness. The distribution of *Glossina* is governed by conditions of climate, vegetation, and surface water (J. Schwetz: Preliminary Note on the Distribution of *Glossina palpalis* in the District of Lomani, Belgian Congo, *Annals Tropical Medicine*, Vol. 9, 1915, Liverpool). All tsetse demand shade. *Glossina morsitans* requires a certain degree of freshness and is not dependent on the immediate proximity of water. *Glossina palpalis* requires a warm damp atmosphere and the immediate presence of water. The limits of its altitudinal range appear to be about 4,000 or 4,500 feet. This species may be found anywhere in stretches of true equatorial forest where there is water, though it may further be carried into the savana regions by the gallery forests. Sleeping sickness, therefore, is characteristically a disease of western Africa—of the Guinea coast and the Congo.

Glossina morsitans, source of the cattle sickness, has a far wider distribution. It is found occupying belts of the savana country. The reason for restriction to these well-defined belts is not understood. Certainly *morsitans*, like other species, is highly sensitive to weather conditions, and it follows seasonal migrations within the limits of the belts, but as yet no satisfactory explanation of its range is forthcoming (Cuthbert Christy: Tsetse Flies and Fly-Belts, *Annals Tropical Medicine*, Vol. 11, 1917-18). Another vexed question concerns the relation of big game to the tsetse and the spread of disease. By certain authorities big game is considered as a reservoir of virus and its destruction or confinement to reservations has been seriously urged (Minutes of Evidence Taken by the Departmental Committee on Sleeping Sickness, *Blue Book Cd. 7350*, London, 1914). More practical seeming proposals have been put forward for elimination of the fly by clearing of rank natural vegetation. But to be economically possible such a measure requires to be followed by continued cultivation and hence must be of slow growth. Meanwhile for a less distant solution the problem demands further research and—it is essentially an international problem—co-operation between the nations responsible for the progress of Central Africa.

PHYSICAL GEOGRAPHY

Recent Developments in the Theory of Glacial Variations. Professor Raoul Blanchard, analyzing the hydraulic regimen of the Pre-Alps and the Great Alps (*Recueil des Trav. de l'Inst. de Géogr. Alpine*, Vol. 5, 1917, Grenoble) shows the influence of glacial sources of stream flow: the great contrast between stream regimens lies between the rain-fed streams with summer minimum and the glacier-fed streams with summer maximum. The sources of both streams are liable to fluctuations. The glaciers advance

and retreat; their variation is reflected in stream discharge. Today, when we know the Alps as the great storehouse of hydro-electric power, stream discharge is a matter of practical importance. As Charles Rabot says at the conclusion of his paper "Récents travaux glaciaires dans les Alpes françaises" (*La Géographie*, Vol. 30, 1914-15), the study of glacial variations is far from being merely one of academic interest.

In the autumn of 1913 of one hundred glaciers of the Swiss Alps 33 were in a state of advance, 8 were stationary, 59 were in retreat: in 1916 there were 64 in advance, 8 stationary, and 28 receding. Variation is not simultaneous; nor from an examination of regional distribution is there any apparent law governing this differential variation. In 1914-15 the Great Aletsch Glacier retreated 6 meters, while its close neighbor the Fiesch advanced 11 meters. The regular series of observations now being carried out on the Alpine glaciers show that the problem of glacial variation is not so simple as it appeared to be when Forel in 1900 essayed to fix its laws. Forel enunciated as one of these laws the statement that glacial variations are changes of volume and not of form. The volume of a glacier may be said to represent the balance between the two factors regulating glacial economy, nivation and ablation, that is to say ultimately between precipitation and temperature. The volume of the glacier is distributed between its upper part, the collector, where nivation exceeds ablation, and the dissipator, or lower part, where ablation exceeds nivation. Glacial flow has been regarded as continuous; hence an increased volume in the collector has supposedly been followed by increased volume in the dissipator. If this be so it is difficult to explain the lack of uniform response of glaciers in the same region to the same climatic variations. But lately careful observations and refined measurements have demonstrated the occurrence of movements affecting the form as well as the volume. In particular glaciers, besides the slow forward movement of the glacial body, waves of intumescence have been observed to pass through the mass, and this wave movement has in all cases been accompanied by general deformation and crevassing of the glacier front. The phenomenon was admirably observed in Yakutat Bay in 1899, when in a few months the unbroken, moraine-covered valley glacier was changed to a sea of crevasses. This development, accompanied by a great movement of advance, had been preceded by an unusually violent earthquake. A probable explanation sees the cause in the dislodgment of enormous masses of ice from the surrounding heights onto the glacier, leading to a sudden forward thrust. The idea of the sudden forward movement advocated in this abnormal case may be carried to the interpretation of normal cases. Nivometric studies in the Alps confirm the conception of discontinuous flow; the slow accumulation in the collector, sudden discharge from it. According to such a conception a glacier will not necessarily react at once to climatic variation. If, however, the variation be sustained, the glacier must ultimately respond; whence during well-marked periods of climatic variation we find all the glaciers of a region behaving similarly. The great Alpine extensions at the end of the sixteenth century, at the beginning and in the middle of the nineteenth century, between 1810 and 1825 and towards 1855, were all universal (P. L. Mercanton: Les variations des glaciers actuels, *Rev. Gén. des Sci.*, Nov. 30, 1917, pp. 631-636; translated in the *Scientific American Suppl.*, March 30, 1918. See also A. G. Ogilvie: Some Recent Observations and Theories on the Structure and Movement of Glaciers of the Alpine Type, *Geogr. Journ.*, Vol. 40, 1912).

ECONOMIC GEOGRAPHY

A Persistent Superstition: The Divining Rod. There has been recently quoted the tale of an Australian sapper who by means of the divining rod discovered water on the arid beaches of Anzac. Under less dramatic circumstances the method is still customary in the sheep-farming regions of Australia and in other regions where water is scarce. It has been the subject of recent controversies in western Europe, and in this country it is credited to an extent that has led the U. S. Geological Survey to issue a special warning (Arthur J. Ellis: The Divining Rod: A History of Water Witching, *U. S. Geol. Survey Water-Supply Paper 416*, 1917). This, however, is not the first condemnation published by the Survey. In *Mineral Resources of the United States for 1882* the superstition was attacked by R. W. Raymond. Raymond pointed out that the surface signs of ground water are easily recognized by the experienced observer, who may acquire an empirical knowledge remarkable for its unconscious acumen; he instances the seemingly uncanny skill of the Indian of the desert West and the art learned from him by the frontiersman. Again, in the case of the artesian well, if a person "has sufficient practical judgment to decide that a certain area or line would probably be suitable for boring, he is pretty sure to be safe in selecting any point of it." With the discredited divining rod go the recent devices described in *Water-Supply Paper 416* under the category of "mechanical water finders." They are the latest expressions of a remarkably

persistent superstition the history of which has given rise to a considerable literature: the bibliography given covers 28 pages!

Crops and Temperature. The relations between crops and weather conditions are highly complex. Many factors enter into the problem. These are not meteorological controls alone. They are also soil conditions, the character of the seed, the time of planting, the methods of cultivation, and the like. Hence the determination of definite relationship is difficult, often impossible. Special attention has lately been paid to rainfall controls. A recent study in agricultural meteorology by D. A. Seeley deals with the temperature element (abstracted in *Monthly Weather Rev.*, July, 1917, pp. 354-359). What the author has in view is the determination of the heat requirements of each crop and a method of evaluating air temperature records in terms of their efficiency to meet these requirements. The method most generally employed is the "summation process," so-called. This consists in adding together the mean daily air temperatures during the life phase of a crop in order to find the thermal requirement. The results differ widely from year to year. Van't Hoff's law, introducing the exponential method, does not take account of the optimum temperature for growth and fails to produce consistent results. Livingston's "physiological index" method of evaluating temperatures, while "based on a reasonable footing," is not satisfactory. The author believes that the temperature of the plant itself deserves more consideration. This is much higher than the air temperature, in sunshine. Observations at East Lansing, Mich., in 1915-16, show that the excess of plant temperature over air temperature averages about 15° in clear, 10° in partly cloudy, and less than 1° in cloudy weather. Curves expressing plant-growth rates and plant temperatures show more decided parallelisms than appear when other temperatures are considered. A formula is evolved for use in determining the effectiveness of air temperature in promoting crop development. R. DEC. WARD

GEOGRAPHICAL NEWS

OBITUARY

HUBERT HOWE BANCROFT, the noted historian, died at Walnut Creek, Cal., near San Francisco on March 2 at the age of 86. He is best known for his "History of the Pacific States of North America" (34 vols., 1882-90; preceded by "The Native Races of the Pacific States of North America," 5 vols., 1874-76). The writing of this monumental work was only made possible by a system of card indexing he devised to digest the enormous amount of source material and the training in its use of a corps of research assistants and collaborators. Mr. Bancroft was a Fellow of our Society.

PROFESSOR PAUL VIDAL DE LA BLACHE of the University of Paris, the dean of French geographers, died on April 5 at the age of 73. Professor Vidal de la Blache, who numbered most of the leading geographers of France among his pupils, may fitly be termed the father of the modern French school of geography, a school which, in its combination of scientific accuracy with a sense of proportion, has made all geographers its debtors. Among his leading works may be mentioned: the "Atlas Général Vidal-Lablache," first appearing in 1890 and kept up to date in succeeding editions, of the maps of which it has truly been said that many "are marked by great ingenuity of conception, and several are unique to this atlas"; the admirable "Tableau Géographique de la France," published as the introductory volume of Lavisse's "Histoire de France" in 1903 and also separately in 1908; and his last work "La France de l'Est: Lorraine-Alsace," published in 1917, which was abstracted *in extenso* in the April *Review* (Vol. 5, 1918, pp. 328-329). A detailed account of his life and achievements, by his son-in-law, Emmanuel de Martonne, and Professor Lucien Gallois, will be found in the "Geographen Kalender" for 1910 (Justus Perthes, Gotha). Another, by Professor Gallois, appears in the latest number of the *Annales de Géographie* (May 15, 1918, pp. 161-173). Professor Vidal de la Blache was awarded the Charles P. Daly Medal of this Society in 1915.

CORRESPONDENCE

To the Editor of "The Geographical Review":

The undersigned trusts that it will be possible to print the following reply to Professor Mark Jefferson's criticism in the November *Review* (Vol. 4, 1917, pp. 399-400) of his article on "The Monsoon." Professor Jefferson writes "Mr. Wallis bases his objections on alleged facts" and appeals to the evidence in Dr. Herbertson's well-known paper published in 1901 (The Distribution of Rainfall Over the Land) and apparently ignores the illustrative data which are appended to the article under criticism. We have, therefore, an apparent conflict of authorities, so perhaps I may be allowed to specify more

definitely those on which my statements are based. Firstly, with reference to the winds, the authority is the monthly pilot charts of the Indian Ocean published by the British Admiralty. Secondly, with regard to rainfall, the authority is "Monthly and Annual Rainfall Normals" published as one of the *Memoirs* of the Indian Meteorological Department (Calcutta, 1913).

Now, consider the "alleged facts": (i) "the rains fall with conspicuous suddenness in June": this refers to the Bombay province and the west coast of the Deccan. Let me refer to the *Memoir;* pp. 118-119 are the first pages dealing with Bombay Province. On those pages there are the facts for thirty stations, and none of these has a record for less than twenty years. The average rainfall for these places is: April, 0.64 inches; May, 2.07 inches; June, 29.96 inches; and the on-shore wind reaches this coast throughout these three months. (ii) "Similarly in Burma and Assam the on-shore winds precede the coming of the rains by weeks." In Assam there are 63 stations with records over at least twenty years. In none of these does the rain in February exceed 3.3 per cent of the total annual fall; nor in March 6.6 per cent of the annual fall, and in all of them the wettest month, which may be June, July, or August, is marked by a precipitation which equals 16.6 per cent of the year's rainfall. In Burma, out of 46 stations 7 have two rainfall maxima, before and after a dry period in July-August; the others are similar to the stations in Assam. The rains beginning in late April or early May are preceded by the southwest winds which begin in late March or early April. (iii) "The northeast trades precede the rains on the Madras coast." In the first place it may be mentioned that, although the north Madras coast trends northeast-southwest, the northeast trades are not entirely parallel to the coast, since the winds blow from easterly quarters and are frequently on-shore winds. The winds begin in October, and it is essential to distinguish between the coastal area with its late-season rains, and the inland area, which is affected by the normal summer rain influence. On the coast the rains come in late October and November, which is later than the beginning of the winds. (iv) "The monsoon as an on-shore wind is fiercest there, yet Sind is arid." This statement will serve to illustrate the main argument of my article, to which Professor Jefferson does not refer. The suggested explanation may be briefly summarized: (a) The desert of Thar is in the desert latitudes, e. g. the Sahara. (b) The equatorial edges of hot deserts receive their rains with an intense summer maximum. (c) The rainfall facts concerning Sind agree with those for other places similarly situated on the equatorial edges of a hot desert. (d) If the monsoon winds did not blow, Sind ought—on account of its location—to have precisely the type of rainfall distribution which it receives. (e) For this and other reasons, I suggest that Indian rains are normal to the latitude.

Professor Jefferson's criticism, "But Sind is low and level, and it is not on low and level lands, especially when heated by a zenithal sun, that monsoon winds are supposed to yield their rainfall," is open to two objections: first, that Sind is north of the tropic and that the "zenithal sun" is scarcely a correct term to apply to Sind in July and August; and, secondly, low and level lands such as the Ganges delta and the northern shores of Australia do receive allegéd monsoon rains from on-shore winds in the hottest months. This last notion, that the Ganges delta is very wet while the Indus delta is arid, is an illustration of the normal character of the rainfall of India; since everywhere the area of summer rains tends to creep round the eastern edges of the hot deserts polewards, so that these eastern edges are as a rule wetter than districts in approximately the same latitude farther west.

These remarks have run to considerable length, which may be, perhaps, excused under the circumstances, as Professor Jefferson's criticisms appear to be invalidated by the weaknesses inherent in the authorities to which he refers. Dr. Herbertson's paper is scarcely adequate as a basis for criticism of a detailed study, the more especially as the data then available were scanty in comparison with those accumulated since 1901.

Very truly yours,

B. C. WALLIS

GEOGRAPHICAL PUBLICATIONS

(Reviews and Titles of Books, Papers, and Maps)

For key to classification see "Explanatory Note" in Vol. II, pp. 77-81

NORTH AMERICA

UNITED STATES

General

HUEBNER, G. G. **Agricultural commerce: The organization of American commerce in agricultural commodities.** xv and 406 pp.; maps, diagrs., bibliogr., index. D. Appleton & Co., New York and London, 1916. $2.25. 8 x 5½.

This is a volume summarizing the existing methods of marketing the chief agricultural products of the United States, with especial emphasis on the methods adopted for grain, cotton, live stock, wool, tobacco, and fruit. The methods of speculative exchanges, the organization of the crop reports, the financing of crops, and the methods of establishing prices are also fully presented.

Certain topics at the moment of much public interest, as for instance the methods of handling the potato crop and dairy products, are not included. In so compact and inclusive a volume adequate space cannot be given for a full presentation of such topics as rural credits and farm loan systems.

The student of economic methods will find in this volume a wealth of reliable information brought together in a usable form. The inquiring farmer who desires to know more as to the why of the "35 cent dollar," which is so universal a query, will secure enlightenment through a reading of the pertinent chapters in this volume. The general reader unaware of how efficiently and practically the greater farm products are handled will gain from this volume a renewed confidence in established grades, in official inspection of agricultural products, and in the methods of making farm products readily available for the consumer at home or abroad. RICHARD ELWOOD DODGE

MOULTON, H. G. **Waterways versus railways.** xviii and 468 pp.; maps, diagrs., bibliogr., index. (Hart, Schaffner & Marx Prize Essays, XIII.) Houghton Mifflin Co., Boston and New York, 1912. $2.00. 8½ x 5½.

Although published six years ago, this remarkably clear and comprehensive analysis of the waterway problem well deserves being freshly called to the attention of students of transportation and commercial geography. The usual supposition in regard to waterway transportation is that it is much cheaper than railway transportation, especially for bulky freight. A painstaking study of the traffic on inland waterways and the actual costs of freight transportation, made not only in this country but in Europe, brought the rather startling conclusion that the development of inland waterways, whether by canals or rivers, except under a few most exceptional circumstances has little economic justification when all factors are taken into consideration. "While canals satisfactorily served the needs of an earlier period, their day, like that of the sickle, the hand-loom, and the spinning-jenny, is now forever past." "To make canals an integral part of a national transportation system, whether for the carriage of high-class or low-grade freight, it matters not, is to attempt to turn backward the clock of time" (p. 456).

The marshaling in this large volume of the abundant evidence that supports these conclusions is, on the whole, most convincing. The author has brought together an enormous amount of information concerning the waterways of Europe and America, their physical conditions, costs, traffic, etc. The first five chapters deal with the revival of interest in waterways in the United States, the geographic and economic factors underlying waterways development, and the reasons for the rise and decline of water transportation in this country. There follow nine chapters descriptive of the canals and river transportation systems of Europe. Of particular interest is the account of German waterways, which are so often used as examples of the advantages of waterway development. Except on the well-favored Rhine, waterway traffic in Germany, the author shows, has been developed through the aid of a governmental policy that compels enormous taxation. In Germany, as in Great Britain, France, and the United States, canals and even canalized rivers have cost enormously more per mile than railroads and their full equipment. Cost of transporting freight by water is substantially greater than by rail.

If in densely populated European countries waterway transportation has proved

uneconomical when compared with the railroads, what justification can there be for it in the United States? This the author answers in the last five chapters of the book. That most of our projects cannot be justified on the ground of transportation advantages alone seems well established. It might be that development of river transportation in connection with other conservation purposes, such as developing of water power or flood control, would be justified. This, however, would require a separate investigation which the author does not attempt. The book deserves a most careful reading by all who are interested in the problem of transportation in this country. G. B. ROORBACH

ALEXANDER, W. H. **Thunderstorms.** Maps, diagrs., bibliogr. *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916,* Vol. 2, Section 2: Astronomy, Meteorology, and Seismology, pp. 55-75 (discussion, pp. 74-75). Washington, D. C., 1917. [Relating especially to the United States.]

BEALS, E. A. **Forecasts of weather favorable to an increase of forest fires.** Maps, bibliogr. *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916,* Vol. 2, Section 2: Astronomy, Meteorology, and Seismology, pp. 257-270 (discussion, pp. 269-270). Washington, D. C., 1917. [United States.]

BLAIR, W. R. **Some results of aerological observations.** Diagrs. *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916,* Vol. 2, Section 2: Astronomy, Meteorology, and Seismology, pp. 632-641. Washington, D. C., 1917. [United States.]

COX, H. J. **Influence of the Great Lakes upon movement of high and low pressure areas.** Maps. *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916,* Vol. 2, Section 2: Astronomy, Meteorology, and Seismology, pp. 432-459 (discussion, pp. 472-473). Washington, D. C., 1917.

FOLKMAR, DANIEL. **The United States census of immigrant stocks.** *Proc. 19th Internatl. Congr. of Americanists Held at Washington, Dec. 27-31, 1915,* pp. 576-581. [Smithsonian Institution], Washington, D. C., 1917.

FOLKMAR, DANIEL. **The United States census of immigrant stocks.** *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916,* Vol. 1, Section 1: Anthropology, pp. 15-22 (discussion, pp. 20-22). Washington, D. C., 1917.

FRANKENFIELD, H. C. **Fog forecasting in the United States.** Maps, diagrs. *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916,* Vol. 2, Section 2: Astronomy, Meteorology, and Seismology, pp. 659-670. Washington, D. C., 1917.

FRANKENFIELD, H. C. **Sleet and ice storms in the United States.** Maps. *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916,* Vol. 2, Section 2: Astronomy, Meteorology, and Seismology, pp. 249-257 (discussion, pp. 252-257). Washington, D. C., 1917.

HENRY, A. J. **The river service of the Weather Bureau.** *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916,* Vol. 2, Section 2: Astronomy, Meteorology, and Seismology, pp. 671-675. Washington, D. C., 1917.

HODGE, F. W. **What the United States Government has done for the science of anthropology.** *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916,* Vol. 1, Section 1: Anthropology, pp. 168-174. Washington, D. C., 1917.

HOPKINS, A. A., edit. **Our country and its resources.** 598 pp.; maps, diagrs., ills., index. (Scientific American Ser.) Munn & Co., Inc., New York, 1917. 8 x 5½. [A guide book of semi-official character.]

HRDLIČKA, ALEŠ. **Anthropology of the Chippewa.** Ills. Extract from the "Holmes Anniversary Volume," pp. 198-227. [Smithsonian Institution], Washington, D. C., 1916. [Introductory paragraphs on Indian population of the United States, now numbering (June 30, 1915) 333,000, of which 174,000 are given as full bloods. Author thinks the correct number is less than 100,000. Assimilation of Indians by whites is proceeding at a steadily increasing rate. Main part of paper relates to the technical anthropology of the Chippewas.]

HRDLIČKA, ALEŠ. **The old white Americans.** *Proc. 19th Internatl. Congr. of Americanists Held at Washington, Dec. 27-31, 1915,* pp. 582-601. [Smithsonian Institution], Washington, D. C., 1917.

MEXICO AND CENTRAL AMERICA

—— **Nicaragua: General descriptive data.** 31 pp.; ills. Pan American Union, Washington, D. C., 1915.

ORDÓÑEZ, E. **Las principales unidades geográficas mexicanas y la distribución de los criaderos minerales.** *Bol. Minero,* Vol. 1, 1916, No. 3, pp. 65-66. [See the note on the introductory article listed in the *Review,* Vol. 1, 1916, pp. 313-314.]

—— **Panama: General descriptive data.** 31 pp.; ills. Pan American Union, Washington, D. C., 1916.

—— **Panama Canal, Annual report of the Governor of the, for the fiscal year ended June 30, 1916.** xxiii and 637 pp.; maps, diagrs., ills. Washington, D. C., 1916. [Contains the full text of the preliminary report upon the possibility of controlling the land slides adjacent to the canal, of which a summary note appeared in the *Review*, Vol. 1, 1916, p. 373.]

PECCORINI, ATILIO. **Estudios sismológicos: Mis exploraciones en el Volcán de Izalco.** Ills. *Diario Latino*, 1915, Dec. 7, parts of pp. 1 and 6. San Salvador.

PORRAS, BELISARIO. **Excursión á la costa de San Blas en Panamá.** Ills. *Bol. Real Soc. Geogr.*, Vol. 58, 1916, No. 4, pp. 401-412. Madrid.

RAMÍREZ F. FONTECHA, A. A. **Noticia geográfica y estadística de la República de Honduras, Centro América.** *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916*, Vol. 11, Section 9: Transportation, Commerce, Finance, and Taxation, pp. 555-616. Washington, D. C., 1917.

—— **República Mexicana, La: Reseña geográfica y estadística.** (1) **Coahuila.** 49 pp.; map, ills. (2) **Chihuahua.** 26 pp.; map, ills. (3) **Chiapas.** By Enrique Santibáñez. 29 pp.; map, ills. (4) **Baja California.** By León Diguet. 40 pp.; maps, ills., bibliogr. C. Bouret, Paris and Mexico, 1900-12. Each 13 x 10. [A praiseworthy compilation of general geographic interest. The maps are moderately well done and the photographs are exceptionally good. The brochure on the peninsula of Lower California is the best of the four and is illustrated by photographs that quite surpass any other collection yet published on this region. They tell a story in themselves. The hachure sketches of Magdalena Bay and other natural harbors are among the best to be had. Carried out for the whole of Mexico the plan would yield a series of state monographs that would give a better geographic picture of Mexico than any other publication.]

—— **Salvador: General descriptive data.** 31 pp.; ills. Pan American Union, Washington, D. C., 1916.

SANDBERG, H. O. **Central America—cattle countries.** Ills. *Bull. Pan Amer. Union*, Vol. 44, 1917, No. 4, pp. 449-464.

THAYER, W. N. **The physiography of Mexico.** Map, diagrs. *Journ. of Geol.*, Vol. 24, 1916, No. 1, pp. 61-94.

—— **Tres Marías, Informe sobre las riquezas naturales de las islas.** *Bol. Oficial de la Secretaria de Fomento*, Vol. 2, 1917, No. 1, pp. 101-105. Mexico. [This island group is off the coast of Tepic, Mexico.]

WATERMAN, T. T. **Bandelier's contribution to the study of ancient Mexican social organization.** Bibliogr. *Univ. of California Publs. in Amer. Archaeol. and Ethnol.*, Vol. 12, 1917, No. 7, pp. 249-282.

WICKER, C. F. **The Pearl Islands of the Pacific.** Map, ills. *Pan-Amer. Mag.*, Vol. 24, 1917, No. 5, pp. 224-234. [In the Gulf of Panama.]

ZARATE, J. C. **Las salinas de México y la industria de la sal común.** 71 pp.; map, diagr., bibliogr. *Anal. del Inst. Geol. de México No. 2.* Secretaria de Industria y Comercio, Mexico, 1917. [With a map showing the distribution of *salinas*.]

ZINN, A. S. **Construction of a narrow gauge railway in the Republic of Panama.** Map, diagr., ills. *Journ. Western Soc. of Engineers*, Vol. 21, 1916, No. 9, pp. 766-783 (discussion pp. 778-783). [This railway, the Chiriqui, was completed July, 1916.]

WEST INDIES

ROOSEVELT, THEODORE. **Where the steady trade-winds blow.** Map, ills. *Scribner's Mag.*, Vol. 61, 1917, No. 2, pp. 169-188.

An intimate description of scenes and people in the Lesser Antilles, including Georgetown in British Guiana. The sympathy and enthusiasm of the descriptive passages remind the reader of Lafcadio Hearn's colorful sketches in "Two Years in the French West Indies," one of the brightest books on the West Indies ever writtten. Colonel Roosevelt's word pictures of towns and landscapes are good geography as well as good literature. Of special interest are his references to the Elizabethan sea dogs who fought their way to enduring glory by sacking towns and harassing the treasure galleons of the Spanish Main; his reference to the strange problem exhibited by the honest and hard-working people of the island of Saba, who are descendants of buccaneers; and his significant outline of the racial and political problems of the West Indies that confront the statesmen of our time. The crime of slavery is fundamentally responsible for the

greatest problem of all. For example: "For over a half-century in the West Indies the negro has done far better in the islands where the government has been, at least at the top, under predominantly white control than he has done in Hayti, whence the whites were expelled with fire and sword a century and a quarter ago. The whites of Hayti came to complete and utter destruction because their forefathers had introduced slavery, so that for generations they ate their bread at ease in the sweat of other men's brows; and then the blacks of Hayti avenged this crime by a crime of their own as monstrous and as short-sighted, and by so doing condemned their own descendants to lag behind or go backward, while their fellows in neighboring regions struggled painfully upward and onward." Grenada is reputed to be in healthy contrast. It "has traveled farthest along the road on which most of the West Indian islands are traveling. Her resident white population, non-official, has almost vanished. It is an island predominantly of black or colored peasant proprietors. They are doing well, thanks to the orderly justice maintained by the representatives of the British Government; they are loyal to the British flag, and in this war have sent nearly five hundred men to join the British army. It is well to face facts. As yet most of the independent states fronting the Gulf of Mexico and the Caribbean Sea have failed to make even a beginning in the path of progress trodden by such South American commonwealths as Brazil, Uruguay, Argentina, and Chile. In the lands under English, French, *and American* (United States) control the conditions of present life and the prospects for the future are immeasurably better for the people as a whole, and especially for the poorer people, than in most—not all—of the neighboring so-called 'independent' states."

—— **Cane sugar industry in America, The commencement of the, 1519-1538 (1563), Documents** [on]. Contributed by I. A. Wright. *Amer. Hist. Rev.*, Vol. 21, 1916, No. 4, pp. 755-780. [Reproduction of nineteen documents found by Miss Wright in the Archivo General de Indias in Seville, with introduction and annotations. The locality dealt with is Santo Domingo.]

—— **Cuba: General descriptive data.** 31 pp.; ills. Pan American Union, Washington, D. C., 1916.

—— **Dominican Republic: General descriptive data.** 31 pp.; diagrs., ills. Pan American Union, Washington, D. C., 1917.

FASSIG, O. L. **Tropical rains—their duration, frequency, and intensity.** Maps, diagrs. *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916*, Vol. 2, Section 2: Astronomy, Meteorology, and Seismology, pp. 460-472. Washington, D. C., 1917. [A comparison of observations in a representative area in the tropics (Porto Rico) and one in the middle latitudes (Maryland).]

FLEAGLE, F. K. **Social problems in Porto Rico.** vii and 139 pp. D. C. Heath & Co., Boston, New York, Chicago, 1917. $1.00. 7½ x 5.

GRIFFIN, WATSON. **Canada and the British West Indies: Report on the possibilities of trade under the preferential tariff agreement.** 173 pp.; maps, ills. Suppl. to *Weekly Bull., Dept. of Trade and Commerce*, Ottawa, 1915. [Chapter 8 abstracted in the *Geogr. Review*, Vol. 4, 1917, p. 146.]

GUTIÉRREZ-LANZA, MARIANO. **El clima de Cuba.** Diagrs. *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916*, Vol. 2, Section 2: Astronomy, Meteorology, and Seismology, pp. 132-172 (discussion, 171-172). Washington, D. C., 1917.

—— **Haiti: General descriptive data.** 31 pp.; ills. Pan American Union, Washington, D. C., 1916.

HALL, MAXWELL. **Notes of hurricanes, earthquakes, and other physical occurrences in Jamaica up to the commencement of the Weather Service, 1880, with brief notes in continuaton to the end of 1915.** 8 pp. [*Weather Rept.*] *No. 455.* Kingston, 1916.

HALL, MAXWELL. **The Jamaica hurricane of October 3, 1780.** Maps. *Quart. Journ. Royal Meteorol. Soc.*, No. 182, Vol. 43, 1917, pp. 221-225.

HENDERSON, J. B. **The cruise of the Tomas Barrera: The narrative of a scientific expedition to western Cuba and the Colorados reefs, with observations on the geology, fauna, and flora of the region.** ix and 320 pp.; maps, diagrs., ills., index. G. P. Putnam's Sons, New York and London, 1916. $2.50. 8 x 5½.

MILLÁS Y HERNÁNDEZ, J. C. **Génesis y marcha de los huracanes antillanos.** Bibliogr. *Proc. 2nd Pan Amer. Sci. Congr., Dec. 27, 1915, to Jan. 8, 1916*, Vol. 2, Section 2: Astronomy, Meteorology, and Seismology, pp. 42-55. Washington, D. C., 1917.

MÖRZER BRUYNS, A. G. **De vooruitgang van Porto Rico onder Amerikaansch beheer, een toekomstbeeld voor onze Bovenwindsche eilanden.** Ills. *Tijdschr. voor Econ. Geogr.*, Vol. 7, 1916, No. 4, pp. 160-166.

MURPHY, L. S. **Forests of Porto Rico, past, present, and future, and their physical and economic environment.** 99 pp.; maps, diagrs., ills., bibliogr. *U. S. Dept. of Agric. Bull. No. 354.* Washington, D. C., 1916. [Abstracted in the *Geogr. Review*, Vol. 3, 1917, pp. 68-69.]

TODD, W. E. C. **The birds of the Isle of Pines.** Map, ills., bibliogr. Reprinted from *Annals Carnegie Museum*, Vol. 10, 1916, Nos. 1-2, pp. 146-296. [The introduction to the report includes a geographical sketch of the area. The Isle of Pines, 800 square miles in extent, is divided into northern and southern parts by the Cienagn de Lanier, a great fresh-water morass resembling the Florida Everglades in its general character. The northern portion, a level gravelly plain broken by a number of isolated heights, has been in part cleared and given over to the cultivation of citrus fruits and pineapples. The inaccessible southern portion is practically uninhabited and is still very imperfectly known. The report is accompanied by a map.]

TREUDLEY, MARY. **The United States and Santo Domingo, 1789-1866.** Bibliogr. *Journ. of Race Devel.*, Vol. 7, 1916, No. 1, pp. 83-145; No. 2, pp. 220-274. [With an introductory chapter on trade relations between the two countries during the eighteenth century.]

VAUGHAN, T. W. **Study of the stratigraphic geology and of the fossil corals and associated organisms in several of the smaller West Indian islands.** Extracted from *Year Book Carnegie Inst. No. 14 for 1915*, pp. 368-373. Washington, D. C.

VAUGHAN, T. W. **The results of investigations of the ecology of the Floridian and Bahaman shoal-water corals.** Reprinted from *Proc. Natl. Acad. of Sci.*, Vol. 2, 1916, Feb., pp. 95-100.

EUROPE

AUSTRIA-HUNGARY

BATTISTI, CESARE. **Il Trentino: Cenni geografici, storici, economici, con un' appendice su l'Alto Adige.** 2nd edit. 64 pp.; maps, ills., index. Istituto Geografico De Agostini, Novara, 1917. L. 3. 10 x 6½.

No more fitting memorial than this summary of knowledge of the Trentino could bear the name of Cesare Battisti, who was made to stand before an Austrian firing squad because of his loyalty to Italy. Among Italian geographers he showed exceeding zeal for detailed studies of the Trentino, and this life work of his has made it possible to bring together in such compact form the salient facts which validate the Italian claims to the region. The maps accompanying the text deserve particular attention both on account of the valuable data they embody and as an example of thoroughness in cartographic presentation.

A comparison of the maps shows that the population of the Trentino is almost exclusively Italian. Past the administrative boundary to the north, however, the Italian element is in the minority everywhere in the Alto Adige. These differences in the population appear to have been taken into account by the Italian government prior to Italy's entry into the war. Italy's unwillingness to include a large German element in its population is evident in the boundary rectification proposed by the Italian government to the Austrian government. The line suggested by Italian statesmen falls south of the line considered the natural boundary by Italian geographers. This geographical line, as shown on Pl. III, coincides with the Danube-Adriatic divide.

The configuration of the land with its lines of access from the north and south shows how easy it was for Teutonic penetration to make headway in the region. The fact was bewailed by Italian chroniclers of the sixteenth century. Plate XVII shows that the Trentino contains within its area a number of the important routes of travel and commerce which connected inland Europe to the southern seas of the continent. Hence Italians and Austrian Teutons have been brought face to face in our day.

The economic character of the region and an intimation of the lines along which future developments are likely to take place is admirably brought out in Plates VII to XV. The high standard set by the firm of De Agostini has been maintained in these maps, and workers engaged in regional studies will profit in making a close examination of the methods used in the treatment of the varied subjects. LEON DOMINIAN

HANN, JULIUS v. **Die Ergebnisse der meteorologischen Beobachtungen auf dem Sonnwendstein (September 1907 bis August 1908, Semmeringgebiet): Ein Beitrag zur Meteorologie der Berggipfel.** 83 pp.; ill. Reprinted from *Sitzungsber. Kaiserl. Akad. der Wiss. in Wien, Mathem.-Naturw. Klasse*, Part IIa, Vol. 125, 1916, No. 1-2.

Von Hann is so thoroughly a master of every phase of meteorology and climatology

that there is hardly any subject in either of these branches of science to which he has not made important contributions. One topic to which he has long devoted attention is mountain meteorology. It was in connection with his study of the Sonnblick records, about 1890, that he discovered the facts which led him to abandon the convectional theory regarding the origin of extratropical cyclones and to propose what has since then been known as the Hann, or eddy, theory.

Von Hann's latest contribution to mountain meteorology is his study of one year's observations on the Sonnwendstein (Sept., 1907-Aug., 1908), an observatory established in 1907 in order to provide a more favorable site for astronomical work than is available in Vienna. It is worth noting, in view of what has occurred since, that Professor George E. Hale and Dr. A. Schuster were among the first to urge the importance of such a station upon the Austrian government. The Sonnwendstein has the advantage of being near Vienna, being easily accessible, and having a good exposure. The elevation of the summit is about 5,000 ft. (1,523 m.). A first-class meteorological station was in operation, temporarily, from September 1, 1907, to August 31, 1908. It appears that only 70 per cent of the intensity of solar radiation which is measured on the Sonnwendstein reaches Vienna. In other words, the turbid atmosphere over the city absorbs 30 per cent.

R. DEC. WARD

ASTORI, BRUNO. **Pola.** Ills. *Riv. Mensile del Touring Club Italiano*, Vol. 22, 1916, No. 10, pp. 551-555.

BERTOLINI, G. L. **L'orologio solare di Aquileia e la sistemazione della rosa dei venti nel medio evo.** Diagrs., ill. *Boll. Reale Soc. Geogr. Italiana*, Vol. 5, 1916, No. 12, pp. 969-985. Rome.

BLINK, H. **Galicië en zijn bewoners.** *Vragen van den Dag*, Vol. 31, 1916, No. 11, pp. 817-829.

CHOLNOKY, EUGEN DE. **Klimatische Wirkung des grossen asiatischen Monsunsystems in Europa.** Diagrs. *Atti X Congr. Internaz. di Geogr., Roma, 1913*, pp. 814-822. Reale Società Geografica, Rome, 1915. [Effects in Hungary.]

CUMIN, GUSTAVO. **La preistoria nella Venezia Giulia.** *Archivio per l'Antropologia e la Etnologia*, Vol. 45, 1915, No. 3-4, pp. 219-240. Florence.

—— **Flotilla austrohúngara del Danubio, La, en la guerra con Rumania.** Maps, diagr. *Rev. Gen. de Marina*, Vol. 81, 1917, No. 3, pp. 333-349. Madrid. [Describes the use of light-draft Austrian monitors in co-operation with land forces along the shifting channel of the central Danube. Austria has considered it necessary to keep up this flotilla in order to ensure free navigation to the Black Sea in times of peace as well as to assist her armies in case of war. Control of the river was an important factor in the success of the Teuton campaign against Rumania. "To the Dual Monarchy the Danube is an artery of life."]

FRESHFIELD, D. W. **The southern frontiers of Austria.** Map, ills., bibliogr. *Geogr. Journ.*, Vol. 46, 1915, No. 6, pp. 414-435 (discussion, pp. 433-435). Also in *Alpine Journ.*, No. 211, Vol. 30, 1916, pp. 1-24. [Noticed in the *Geogr. Review*, Vol. 4, 1917, p. 212.]

GERBA, RAIMUND. **Die Grenze von Galizien.** *Österreichische Monatsschr. für den Orient* (herausgegeben von K. K. österreichischen Handelmuseum in Wien), Vol. 41, 1915, No. 9-12, pp. 320-323.

GRIBAUDI, PIERO. **Il porto di Trieste e la sua funzione economica.** *Boll. Reale Soc. Geogr. Italiana*, Vol. 6, 1917, No. 2-3, pp. 128-156. No. 4-5, pp. 336-355. Rome.

HECKE, WILHELM. **Die Ortsnamenschreibung in Österreich.** *Petermanns Mitt.*, Vol. 62, 1916, Sept., pp. 327-328.

HRDLIČKA, ALEŠ. **Bohemia and the Czechs.** Ills. *Natl. Geogr. Mag.*, Vol. 31, 1917, No. 2, pp. 163-187. [A strong and interesting paper by the well-known anthropologist. While chiefly historical and political, it contains valuable geographical data on population, immigration, and national character.]

JOVANOVIC, V. **Illustrierter Führer durch Mödling und Umgebung.** xi and 81 pp.; ills., bibliogr. J. Thomas Verlag, Mödling, [1916]. Kr. 1.20. 6 x 4½.

LÓCZY DE LÓCZ, LOUIS. **La géomorphologie des environs du lac Balaton.** Maps. *Atti X Congr. Internaz. di Geogr., Roma, 1913*, pp. 550-560. Reale Società Geografica, Rome, 1915.

MUSONI, F. **Il M. Nero e la toponomastica della Venezia Giulia.** Map. *Riv. Geogr. Italiana*, Vol. 23, 1916, No. 6-7, pp. 233-253.

PAWLOWSKI, STANISLAW. **Résumé [sur la morphologie des Klippes des Piénines].** *Odbitka z czasopisma Polskiego Towarzystwa Przyrodników im. Kopernika*, Vol. 40, 1915, pp. 138-140. Lemberg.

PAWLOWSKI, STANISLAUS. **Über ein altes Talstück in der Bukowina.** Map. Reprint from *Mitt. der Geol. Gesell.*, Vol. 3, 1914, No. 4, pp. 246-255. Vienna.

PAWLOWSKI, STANISLAW. **Z geomorfologii wyspy Veglii.** Bibliogr. Reprinted from *Odbitka z czasopisma Polskiego Towarzystwa Przyrodników im. Kopernika*, Vol. 39, 1914, pp. 681-684. Lemberg. [Observations on the geomorphology of the island Veglia. "The valley of the river Fiumera near Bescanuova is occupied by a sedimentary series of Eocene age. According to the published descriptions of Stache and Waagen these rocks include sandstones with and without fossils and conglomerates. They form a part of a great synclinal fold, resting on limestones of Cretaceous age. The beds lie not flat, but are dipping from north to south. Erosion has removed the upper portion of the series. The remnants of the old level are terraces along the sides of the valley."]

SPITALER, R. **Der tägliche Gang der Windgeschwindigkeit, insbesondere der stürmischen Winde auf dem Donnersberge.** Diagrs. *Meteorol. Zeitschr.*, Vol. 33, 1916, No. 8, pp. 337-351. [Bohemia.]

ASIA

TURKEY IN ASIA, ARABIA, CAUCASIA, IRAN

RAMSAY, W. M. **The intermixture of races in Asia Minor: Some of its causes and effects.** 64 pp. Reprinted from *Proc. British Academy*, Vol. 7. Humphrey Milford, Oxford University Press, London, [1917]. 3s. 6d. 9½ x 6.

An historical characteristic of the Ottoman population has been its utter lack of homogeneity. Professor Ramsay explains this condition as based on ancient shiftings of Asiatic peoples. Asia Minor is a bridge land, and a human residue from each passing wave has been deposited upon it. Since the decline of Ottoman power in Europe and the beginning of a persistent Turkish recession the Mohammedans of lost provinces have been induced to settle in Asia Minor. Russian Mohammedans seeking escape from Christian allegiance have added their quota to the population in modern times. Thus the influx of alien elements into the peninsula has been steadily maintained for the last seven hundred years.

Ramsay's account is enlightening because it shows what changes may take place in the population of a region through a slow infiltration of aliens maintained uninterruptedly. At the same time the persistence of a local type and its remarkable power of absorbing the foreign element is brought out. Thus the population of Asia Minor, notwithstanding the strongly marked cultural cleavage lines which it betrays, presents striking anthropological similarity.

A tendency appears in places to ignore the part played by geography, as when the destruction of the Byzantine social order is attributed to the introduction of nomadism in Asia Minor by the Turks. Here the author fails to note that the interior plateau is physically an ideal environment for the nomad. The Turk, fresh from Asiatic wanderings and having never thought of settling, naturally kept up his accustomed mode of life in Anatolia because nature invited him to it. Thus Anatolia became the cradle of the modern Turkish state. For the last two centuries it has been the main recruiting ground of Turkish armies. But its man power is now on the wane, and the danger of the transformation of the Turkish state into "a great military weapon of the same kind as it was in the beginning" may not appear as great as the author intimates. Turkey entered the war with an army exhausted by the Balkan Wars, and has since lost the bulk of its southern territory. Today the real Turkish danger lies outside of the Turkish boundary.

Perhaps the chief value of Professor Ramsay's work is to show the impossibility of unifying backward races assembled under the rule of a single state. Supervision by the better organized powers then seems to be a necessity. LEON DOMINIAN

WATSON, C. M. **Fifty years' work in the Holy Land: A record and a summary, 1865-1915.** Palestine Exploration Fund. 190 pp.; map, ill., index. The Committee of the Palestine Exploration Fund, London, 1915.

This volume is an inventory of achievement which fittingly commemorates the fiftieth anniversary of the founding of the Palestine Exploration Fund. Glancing over the field of varied studies conducted by the members of this famous institution, one can hardly abstain from attributing, at the very outset, greater weight to its surveys than to any other branch of its work. History, geology, archeology, anthropology, and religion all received important contributions; and yet none of the results in these branches of study can claim the all round usefulness of the cartographic achievements. The most extensive surveys of Palestine so far recorded in map form are due to the labor of a number of well-known workers who gave their time to the Palestine Exploration Fund.

A few years after the foundation of the society in 1865 it became evident that no reliable work could be undertaken without an accurate base map. The only section of Palestine of which trustworthy maps then existed was the coast, which had been charted by the British Admiralty. The survey of western Palestine was undertaken first. Operations lasted from 1871 to 1877. The results of this important work appeared in 1880 in the shape of a one inch to the mile map, which may be considered as one of the most important scientific productions that has come out of the Holy Land. Through this map the historical value of many Biblical passages was determined. Needless to add that the map has also served as a base for investigations of a wide range and that it has been indispensable to travelers.

The success which attended the production of this important cartographic document led the Committee of the Palestine Exploration Fund to extend operations to eastern Palestine. In spite of considerable difficulties it succeeded in bringing out another valuable map of Palestine on the scale of ⅜ of an inch to the mile. Today these maps, although somewhat antiquated as regards modern methods of reproduction, still remain reliable standards for this section of the world. Further work in southern Palestine undertaken in 1913-14 was cut short by the war.

A mass of material on the history and geography of the Holy Land has also been disseminated among students through the Fund's publication of a series entitled the "Palestine Pilgrims' Texts." The list of volumes published shows that Palestine has attracted Christian tourists since the early centuries of our era. As a contribution to the history of travel in ancient and medieval days this series takes a leading rank.

AARONSOHN, ALEXANDER. **With the Turks in Palestine.** xiv and 85 pp.; ills. Houghton Mifflin Co., Boston and New York, 1916. $1.25. 9 x 6.

—— **Adalia, Wirtschaftsverhältnisse in.** *Österreichische Monatsschr. für den Orient* (herausgegeben von K. K. österreichischen Handelmuseum in Wien), Vol. 41, 1915, No. 9-12, pp. 305-317.

BANSE, EWALD. **De bevolking van Klein-Azië.** *Vragen van den Dag*, Vol. 31, 1916, No. 12, pp. 910-923.

BLINK, H. **Arabië en de Arabieren in den loop der eeuwen tot den tegenwoordigen tijd.** *Vragen van den Dag*, Vol. 32, 1917, No. 6, pp. 467-478.

CHILDS, W. J. **Across Asia Minor on foot.** xvi and 459 pp.; map, ills. Dodd, Mead and Co., New York, William Blackwood & Sons, Edinburgh and London, 1917. $4.00. 9 x 6. [Attractively written travel notes of a trip undertaken shortly before the outbreak of the war.]

DINGELSTEDT, V. **Arabia and the Arabs.** *Scottish Geogr. Mag.*, Vol. 32, 1916, No. 7, pp. 321-330; No. 8, pp. 366-373.

DOLOT, G. **L'influence française en Mésopotamie.** Preface by Maurice Barrès. xv and 96 pp.; map, ills. Frédéric Weber, Tunis, 1915. 3 fr. 8 x 5⅛.

EREDIA, FILIPPO. **Sul clima di Bagdad.** Diagr. *Boll. Reale Soc. Geogr. Italiana*, Vol. 6, 1917, No. 6, pp. 436-444. Rome.

KNOBEL, F. M. **Mesopotamië.** *Vragen van den Dag*, Vol. 32, 1917, No. 5, pp. 391-407.

LAMY, ÉTIENNE. **La France du Levant.** 385 pp. Plon-Nourrit et Cie, Paris, 1900. 7 fr. 50. 9 x 5½.

MASTERMAN, E. W. G. **Palestine: Its resources and suitability for colonization.** Diagrs., ills. *Geogr. Journ.*, Vol. 50, 1917, No. 1, pp. 12-32 (discussion, pp. 27-32).

MAUNDER, A. S. D. **Iranian migrations before history.** Reprint from *Scientia*, Vol. 19, 1916, February, pp. 115-124. Nicola Zanichelli, Bologna. [Abstracted in the *Geogr. Review*, Vol. 3, 1917, p. 490.]

MONTESSUS DE BALLORE, F. DE. **La sismología en la Biblia.** Map. *Bol. Servicio Sismológico de Chile*, Vol. 11, pp. 27-165. Santiago, 1915.

NÉOPHYTUS, FRÈRE. **Le préhistoire en Syrie-Palestine.** Map, ills. *L'Anthropologie*, Vol. 28, 1917, No. 4-5, pp. 313-350.

OLMSTEAD, A. T. **The political development of early Babylonia.** Reprinted from *Amer. Journ. of Semitic Languages and Literatures*, Vol. 38, 1917, No. 4, pp. 283-321. [Abstracted in the *Geogr. Review*, Vol. 4, 1917, p. 489.]

PACE, BIAGIO. **Attraverso la regione di Adalia.** 22 pp.; ills. Stabilimento Tipografico Virzi, Palermo, 1915.

PRESENTI, GUSTAVO. **La situazione politico-militare nell'Arabia e gl'interessi dell'Italia.** *Riv. Coloniale*, Vol. 12, 1917, No. 3, pp. 107-116; No. 4, pp. 165-171.

RAEBURN, HAROLD. **The central Caucasus: Present conditions and probable future development.** Map, ills. *Scottish Geogr. Mag.*, Vol. 33, 1917, No. 5, pp. 193-208. [See also the note "Are the Tribes of the North-western Caucasus Mountains Tatars?" by Harold Raeburn (*Scottish Geogr. Mag.*, July, 1917). The description of certain mountain tribes as Tatar is here criticized.]

—— **Turkey in Europe and Asia.** 22 pp.; map. (Oxford Pamphlets, 1914.) Oxford University Press, New York Branch. 2d. 7½ x 5.

USPENSKIJ, F. I. **Second rapport sur une expédition à Trébizonde et ses environs.** *Bull. Acad. Imp. des Sci. [de Pétrograd]*, Ser. 6, 1916, No. 17, pp. 1657-1663. [In Russian.]

WILLCOCKS, WILLIAM. **The future of Mesopotamia.** *Near East*, No. 282, Vol. 11, 1916, Sept. 29, pp. 521-522; No. 283, Oct. 6, pp. 545-546. [Abstracted in the *Geogr. Review*, Vol. 3, 1917, pp. 244-245.]

WOODS, H. C. **The Baghdad Railway and its tributaries.** Maps, ills., bibliogr. *Geogr. Journ.*, Vol. 50, 1917, No. 1, pp. 32-57 (discussion, pp. 56-57). [Abstracted in the *Geogr. Review*, Vol. 4, 1917, p. 320.]

CHINA

BASHFORD, J. W. **China: An interpretation.** 630 pp.; ill., bibliogrs. index. The Abingdon Press, New York, Cincinnati, 1916. $1.00. 9 x 6.

Bishop Bashford, who has traveled extensively during a twelve-year residence in China, has talked with many people and filled many notebooks in an "endeavor to interpret the Chinese to the Western world as we would like Chinese writers to interpret Americans and Europeans to the Orient." He has digested the matter in most of the available literature on the subject and arranged his treatise on social, economic, political, and intellectual China in twelve consecutive chapters which constitute perhaps the most convenient and accurate brief account of the country and its people to be found today in print. The remaining six chapters of the volume consist of discussions on the relations between China and other nations, in which the author, while carefully maintaining his attitude of benevolent neutrality, adds little of value to what has already been printed upon a highly controversial topic. It does not militate against the usefulness of his book to say that his authorities are all foreign; available data for an account of China are not to be found in works in the Chinese language, nor are natives there able to describe the physical or industrial factors in their own development without recourse to the books of foreign investigators. Bishop Bashford's brief bibliographical lists at the end of each chapter add measurably to the value of his book. Considerable use has been made of Werner's "Descriptive Sociology of the Chinese," the most expensive but perhaps the most satisfactory volume in Herbert Spencer's great series on descriptive sociology, a book seldom noticed by writers on China, but one without which no library on that country is complete. F. W. WILLIAMS

HULLU, J. DE. **Over den Chinaschen handel der Oost-Indische Compagnie in de eerste dertig jaar van de 18e eeuw.** *Bijdragen tot de Taal-, Land- en Volkenkunde van Nederl.-Indië*, Vol. 73, 1917, No. 1, pp. 32-151. The Hague.

The rise of the Dutch East India Company is, of course, a matter of wide interest to the student of the colonization of the Far East and the history of the Dutch possessions. One of the more important side issues of this company was a trade with China. Direct commerce between the Netherlands and China being impossible owing to certain territorial treaties among such European nations as had an Oriental commerce in the seventeenth and eighteenth centuries, the Dutch East India Company was at first absolutely dependent upon Chinese vessels to carry tea and other exports from the Celestial Empire to Batavia, whence they were transshipped to company vessels and carried to Amsterdam. According to De Hullu, unwise laws and prohibitive restrictions, with accompanying heavy fines for transgressions, caused the Chinese merchants at one time to withdraw their vessels from routes leading to Dutch East India ports and as a consequence the Dutch East India Company became hard pressed to supply their warehouses in Amsterdam with the much-needed Chinese commodities. In addition to this, a rival company, the Ostend Company, financed by bankers in Vienna and Brussels, regardless of treaties and trade agreements, began to send vessels direct to China and were instrumental in cutting the Chinese profits of the Dutch East India Company to an almost fatal degree. How profitable the Chinese trade was, is explained by figures given by De Hullu, who describes at length a trading voyage of the *Coxhorn* from Amsterdam to Wampoo (Huampo), China. This vessel, with a cargo capacity of about 150 tons, arrived at a home port after an eighteen months' trip with a cargo on which the net profit amounted

to 324,471 guilders (about $128,000). This, with a vessel unable to carry more than 150 tons of cargo, seems well-nigh incredible, especially so when one takes account of the greater purchasing power of a guilder in 1730 than in 1918. It is of interest to note the goods contained in the *Coxhorn's* cargo: 268,479 pounds of tea, 570 bolts of silk of all colors, 124,595 cups and saucers for tea, 17,040 cups and saucers for coffee, 9,457 cups and saucers for chocolate, 116 table services, etc. It was this profitable voyage which brought forth a storm of protest from the Directors of the India House in London, who claimed the Hollanders had violated the privileges of the English East India Company by direct trade with China.

One of the remedies tried by the Dutch East India Company to overcome the evil of a restricted trade with China was an attempt to make the planters in Java undertake tea culture. This attempt, however, was not successful, as the company, while agreeing to purchase all tea grown, did not agree to finance the planters in their undertaking. A careful perusal of De Hullu's paper will convince the reader that Pitt's doggerel

"In matters of commerce, the fault of the Dutch
"Is giving too little and asking too much"

would not be misapplied to the Dutch East India Company and that the greater part of the company's misfortunes in its China trade was caused directly by the unwise restrictions and greedy policy imposed by the Council of Seventeen in Amsterdam, who frequently were totally ignorant of the conditions with which their deputies in the colonies had to contend.

The investigator of Oriental trading methods in the eighteenth century can find important data in De Hullu's paper, and the description of the means by which Chinese customhouse officials had to be propitiated is instructive and amusing. Ceremonial visits paid by the captains of incoming vessels to the *hoppo* (chief customs officer), with the invariable tea drinking and the equally invariable monetary "gift" to the *hoppo*, are described in full. Dr. De Hullu is to be congratulated on having brought out a paper which covers the subject so completely. THEODOOR DE BOOY

BROOKS, C. E. P. **A meteorologist in China.** Maps, diagrs. *Quart. Journ. Royal Meteorol. Soc.*, No. 181, Vol. 43, 1917, pp. 1-14 (discussion, p. 14).

BROWN, J. C. **Contributions to the geology of the Province of Yünnan in western China: 5. Geology of parts of the Salween and Mekong Valleys.** Map, ills. *Records Geol. Survey of India*, Vol. 47, 1916, Part IV, pp. 205-266. Calcutta. [With notes on the physical geography.]

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CATELLANI, ENRICO. **La penetrazione straniera nell' Estremo Oriente: Sue forme giuridiche ed economiche.** 500 pp.; maps, diagr., index. G. Barbèra, Florence, 1915. 7½ x 5.

CHU, CO-CHING. **Distribution of precipitation in China during the typhoons of the summer of 1911.** Maps. *Monthly Weather Rev.*, Vol. 44, 1916, No. 8, pp. 446-449. [Abstracted in the *Geogr. Review*, Vol. 3, 1917, p. 403.]

DINES, J. S. **Meteorological notes on a voyage up the China coast, January, 1915.** Map. *Quart. Journ. Royal Meteorol. Soc.*, No. 179, Vol. 42, 1916, pp. 181-183. [Phenomena encountered in the Yellow Sea during an unusually severe winter.]

LEGENDRE, A. F. **Sur la structure du massif sino-thibétain.** Map. *Comptes Rendus de l'Acad. des Sci.* [*de Paris*], Vol. 164, 1917, April 10, pp. 577-580. Paris.

LEONG, Y. K., AND L. K. TAO. **Village and town life in China.** With a preface by L. T. Hobhouse. xi and 155 pp. (No. 4 of the *Monographs on Sociology* of the London School of Economics and Political Science—University of London.) Macmillan Co., New York, and George Allen & Unwin, Ltd., London, 1915? $1.50. 8½ x 5½.

MEYER, F. N. **China a fruitful field for plant exploration.** Map, ills. From *Yearbook of Dept. of Agric. for 1915*, pp. 205-224. Washington, D. C., 1916. [Abstracted in the *Geogr. Review*, Vol. 3, 1917, p. 148.]

MILLOT, STANISLAS. **Pékin et ses palais en avril 1901.** 45 pp.; diagr., ills. Ernest Leroux, Paris, 1916. 9½ x 6.

MULLER, HENDRIK. **Onze vaderen in China.** 105 pp.; map. Reprinted from *De Gids*, 1917, No. 2. Amsterdam.

OLIVECRONA, G. W. **The West River survey of 1916.** Ills. *Far Eastern Rev.*, Vol. 13, 1917, No. 11, pp. 413-417. [Abstracted in the *Geogr. Review*, Vol. 4, 1917, p. 148.]